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1952

A consideration of some major learning principles involved in effective training film production.

Jansen, Gilbert B.

Ohio State University

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MASTER OF ARTS THESIS  
(Psychology)

Ohio State University, 1952

Cdr. Gilbert B. Jansen, Jr., USN.

J29  
THESIS



A CONSIDERATION OF SOME MAJOR LEARNING  
PRINCIPLES INVOLVED IN EFFECTIVE  
TRAINING FILM PRODUCTION

A Thesis

Presented in Partial Fulfillment of the Requirements  
for the Degree Master of Arts

By

GILBERT B. JANSEN, Jr., A.B.

The Ohio State University

1952





THE MOTION PICTURE

"One stands on a high mountain and sees long lines of men, women, and children moving slowly forward. They come from everywhere. They are rosy-cheeked girls from the farms, and their paler-faced sisters from the cities whose feet ache from long hours behind bargain counters. There are plow boys, and sons of millionaires, and boys with the sallow cheeks of the tenements. There are old women with hands reddened and coarsened by work and with eyes grown listless with long waiting. There are old men who hobble on crooked sticks, and children with the flash of the sun's gold in their hair and the happy laughter of innocence in their voices. There are the schoolboy, and the savant, and the man of no learning at all. There are men and women of every race and of every tongue, moving slowly forward, seeking something, seeking, searching, yearning-- asking for a place to dream. All about them is the roar of the cities, the confused, jangling noises of life that is hurried, rushed, propelled forward at a breathless speed. Every minute of every hour of every day they come-- millions of them. And over and above them, and in front of them, attracting them on, offering that which they desire, are billions of flickering shadows-- the motion picture. Who shall estimate its importance? Who shall attempt to say what it means to the world?"

Will H. Hayes

Former President, Motion Picture Producers  
and Distributors of America





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A CONSIDERATION OF SOME MAJOR LEARNING  
PRINCIPLES INVOLVED IN EFFECTIVE  
TRAINING FILM PRODUCTION

Abstract of  
A Thesis

Presented in Partial Fulfillment of the Requirements  
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By

GILBERT B. JANSEN, Jr., A.B.

The Ohio State University

1952





A CONSIDERATION OF SOME MAJOR LEARNING  
PRINCIPLES INVOLVED IN EFFECTIVE  
TRAINING FILM PRODUCTION

GILBERT B. JANSEN, JR.

A.B., Occidental College, 1940

Department of Psychology  
(Approved by John E. Horrocks)

It has been the purpose of this study to investigate the problems revolving around the assumption that the production of instructional motion pictures should be governed by definite and acceptable principles of psychological learning as adaptable to the unique characteristics of teaching through films. In consequence, this study has attempted to investigate some of the more important of those related learning principles that appear to be essential in the production of effective instructional films. The most pertinent of the applicable motion picture learning principles have been compiled and emphasized through integration with selected, practical film production techniques developed by recent research in this field.

The methods and procedures employed in gathering the data involved a detailed investigation of currently accepted principles of learning, selecting the most appropriate of these, and applying them where feasible to current instructional film production techniques. This was accomplished by a broad review of the available literature, an analysis of The Join

A REPRODUCTION OF SOME OF THE MATERIALS  
OBTAINED FROM THE INVESTIGATION  
CONDUCTED BY THE FBI

WILLIAM D. JAMES, JR.

U.S. DEPARTMENT OF JUSTICE, 1940

Department of Psychology  
(Approved by J. Edgar Hoover)

It was the purpose of this study to investigate the  
various factors which influence the production of  
an instrumental action which is governed by  
certain and specific principles of psychological learning  
as applicable to the study of the production of learning  
through film. In connection with this study was attempted to  
investigate some of the more important of these factors  
learning principles that appear to be involved in the pro-  
duction of effective instrumental film. The most important  
of the applicable action factors learning principles have  
been recognized and explained through investigation with relation  
to the production techniques developed by means re-  
search in this field.

The methods and procedures employed in gathering the data  
involved a detailed investigation of currently accepted prin-  
ciples of learning, selecting the most important of these,  
and applying them where feasible to various instrumental film  
production techniques. This was accomplished by a broad re-  
view of the available literature, an analysis of the data

Army, Navy, and Air Force Instructional Film Research Project, and implemented by the writer's personal training and experience in motion picture photography.

From the investigation conducted by this study, there emerge several basic conclusions relevant to motion pictures in training, orientation, and information.

1. The instructional effectiveness of teaching films can be increased, provided that improvements are instigated in all stages from production to utilization, and not simply at the production stage alone.

2. The relationship of the film content to the audience and the relevance of film use, are as important to the effectiveness of films in instruction as is the film itself.

3. Treatment of film content in accordance with pertinent psychological and instructional principles which govern audiences reaction is of greatest importance. Elaborate musical scores and special effects appear to be of minor importance in instructional films.

It can be assumed from this study that motion pictures and television are potentially powerful mass communication devices. Further research seems indicated in order to more clearly determine the effect of this power and influence in all fields of education.



and, finally, the fact that the investigation was conducted in a manner which was consistent with the principles of the investigation and the results of the investigation were consistent with the principles of the investigation.

From the investigation conducted by the study, there were several key findings which are listed in the following, including, but not limited to:

1. The investigation identified several key findings which are listed in the following, including, but not limited to: all aspects of the investigation are consistent with the principles of the investigation and the results of the investigation were consistent with the principles of the investigation.

2. The reliability of the data collected in the investigation and the relevance of the data are consistent with the principles of the investigation and the results of the investigation were consistent with the principles of the investigation.

3. The results of the investigation are consistent with the principles of the investigation and the results of the investigation were consistent with the principles of the investigation.

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5. The results of the investigation are consistent with the principles of the investigation and the results of the investigation were consistent with the principles of the investigation.

## CHAPTER I

### THE PROBLEM AND ITS SCOPE

In the culture of today motion pictures comprise 98 per cent of all theatrical entertainment, this is irrespective of their use in schools, colleges, and military services as part of educational courses. Immigrants are shown free films as part of the program of Americanization. Motion pictures taken through microscopes and X-ray machines are used by scientists in their laboratory studies as well as by educators. Newsreels have become a vital form of news reporting and a vivid medium of recording current history. These and other motion picture types are rapidly becoming an important part of television programs. (12)

#### I. THE PROBLEM

Statement of the problem. It is the purpose of the present study to investigate the problems revolving around the assumption that the production of instructional motion pictures should be governed by definite and acceptable principles of psychological learning as adaptable to the unique characteristics of teaching through films. It is firmly believed that such principles must be incorporated into the production stage of the instructional motion picture if the end product is to be successfully and gainfully employed.

to the nature of today's motion picture business. In the case of all theatrical entertainments, this is irrespective of their use in schools, colleges, and military services as part of educational courses. Theaters are shown free films as part of the program of desensitization. Motion pictures are used through microscopes and X-ray machines are used by scientists in their laboratory studies as well as by educators. Theaters have become a vital form of mass recreation and a vital medium of recording current history. These and other motion picture uses are rapidly becoming an important part of educational programs. (11)

1990年 2月 4日

Statement of the Council. It is the purpose of the Council to investigate the problems involving the protection of intellectual property in the field of psychology and to determine the principles which should govern the protection of intellectual property in this field. It is the purpose of the Council to determine the principles which should govern the protection of intellectual property in this field.



Consequently, the primary purpose of this study has been to discover and learn some of the more important of those related psychological learning principles that appear to require essential and necessary consideration if educational motion pictures, be it direct projection or televised, are to fully exploit their many outstanding teaching potentialities.

A secondary purpose has been to compile the most dynamic and pertinent of these apparent motion picture learning principles, parallel them with selected, practical film production techniques developed through recent research, and include them all in the thesis as a basis for useful application as well as a guide to further study.

Importance of the study. If all the inventions of modern times were carefully grouped and catalogued with respect to their particular contribution to the intellectual and cultural environment of America, one invention would, by the very nature of its influence, stand out from all the others --- the motion picture. Only in recent years has the pinnacle of success reached by this very desirable entertainment medium been ostensibly threatened, and that by a virtual blood relative of the cinema, television. Be that as it may, it becomes readily evident that inasmuch as the motion picture and television do have so much in common, there can be no avoiding the prediction that eventually the two will be forced to merge their respective entertainment, propaganda,



consequently, the primary purpose of this study has been to discover and learn more of the most important of these related psychological learning principles. This approach is highly essential and necessary investigation if educational action programs, be it direct instruction or indirect, are to fully exploit their own outstanding learning potentialities.

A secondary purpose has been to compile the most dynamic and pertinent of these superior action plans learning principles, principles that with selected, practical and instructional techniques developed through various research, and indicate how all in the field as a basis for further exploration as well as a guide to further study.

Importance of the Study. It is the intention of the author to carefully grouped and categorized with respect to their particular contribution to the instructional and cultural development of America, one invention would be the very nature of the invention, which has been all the others -- the action plan. It is in these plans that the classic of theories needed by this very scientific establishment would be most effectively expressed, and thus by a direct and related to the science, education, or that as it may, it becomes readily visible and known as the action plan and education as such is known, there can be no denying the position that eventually the two will be forced to supply their respective arrangements, programs,

or educational potentials, as the case may be. As a result of such an incorporation, the older, more experienced film world will contribute all of its cinematic technical skill and stagecraft to the potent and greater distributing power of electronic picture transmission through the ether. Once certain economical, engineering, and political obstacles have been surmounted, the American public will be at the mercy of a new and formidable cultural machine. This television of the immediate future will be realistically and forcefully capable of presenting any event or phenomena to citizens in every walk of life through the simple expedient of flicking a switch. (17)

Thus, it behooves the educators of today to take proper measures to harness this impending Frankenstein monster while it is still in the embryonic stage. It is the directors, supervisors, and coordinators of visual education in educational systems, institutions, and organizations who must continue to establish liaison between teacher and film producer. It is they who will promote the program among those who must support it and those who will execute it, and it is they who will administer the program on the local level. Subsequently, it is important that these groups understand one another's problems and points of view, and that they work together in the solution of problems to mutual satisfaction. Filmmakers must understand the point of view of educators.

of educational institutions, as the case may be. It is a result  
of such an investigation, the idea, with experienced view  
being still somewhat all of the elements technical skill  
and especially in the science and practice of electrical power  
of electrical plant transmission through the line. These  
certain economic, engineering, and political conditions have  
been mentioned. The various points will be of the nature of  
a new and technical universal nature. This is called as  
the immediate future will be technically and technically  
aspects of increasing the speed of transmission is called in  
every well of the world the study of electrical  
a subject. (17)

Then, it follows the advance of today to the proper  
method of having this technical transmission system which  
it is still in the technical state. It is the director,  
investor, and coordination of virtual resources in educa-  
tional system, institutions, and organizations who are  
concerned in technical fields between science and the pro-  
cess. It is those who will remove the various social and  
a social support it and those who will remove it, and it is  
of who will establish the system on the local level.  
Consequently, it is important that these groups understand  
the other's problems and points of view, and that they work  
together in the solution of problems to mutual satisfaction.  
Therefore must understand the roles of view of education.



Educators must understand the problems of producers. Visual educationists must understand both. (21)

Although problems peculiar to this specific situation are still in the foreseeable future, preparations will have to be made now. Not only will regulations and legislation have to be established to forestall unscrupulous propaganda and nefarious educational presentations, but effective and practical principles of educational learning will have to be compiled, consolidated, and proven in the intervening years prior to the influential onslaught upon mass intelligence. By erecting a bulwark of constructive rules and requirements for the production of teaching films, the quality of the educational future of generations to come can not help but be reasonably assured. Fortunately such a procedure can and is being currently investigated. The eventual establishment of sound principles governing the production of teaching films following a uniform code of arrangement, in order that the utmost learning may be derived from motion pictures, will constitute an important milestone in the employment of visual education methods. (18)

Hoban (21) has pointed out that now, as never before, educators and the public alike seem to be convinced that education must shed its bookish quality, and that it must deal vigorously and effectively with social issues and moral conduct. The late enemies of World War II have demonstrated the effectiveness of organized education in teaching a set of

Education must understand the problem of progress. Visual  
Education must understand both. (1)

Although progress is in this specific situation  
and still in the formative future, progress will have  
to be made now. Not only will regulations and legislation  
have to be established so that all necessary progress  
and reform educational progress, not otherwise and  
practical principles of educational progress will have to be  
accepted, established, and proven in the intervening years  
prior to the industrial revolution upon which is based.  
By studying a subject of scientific value and progress  
for the production of learning time, the quality of the edu-  
cational future of progress to come can not help but be  
necessarily secured. Fortunately such a procedure can and is  
being actively investigated. The eventual establishment of  
sound principles governing the production of learning time  
following a matter of assessment, in order that the  
soundest learning may be derived from every student, will  
constitute an important milestone in the development of visual  
Education methods. (2)

And (3) has pointed out that now, as never before,  
teachers and the public alike seem to be convinced that edu-  
cation must have its social quality, and that it must deal  
effectively and effectively with social needs and social con-  
ditions. The few examples of facts that I have mentioned in the  
development of organized education in learning a set of



moral principles (to Americans, immoral) so conclusively as to dominate the thinking, feeling, and acting of an overwhelming proportion of the population. Their educational techniques and procedures were complete and effective-- so much so as to throttle deviation of individual thought and action. But they demonstrated the power of the educational process AS SUCH when all media of education are put to use.

Hoban (21) continues by showing that commerce follows films. Ideas and enlightenment also follow them. This has been illustrated in films produced and used in the morale, information, and instructional programs of the war. More than ever is there need to mobilize these same resources to advance and disseminate the technology and morality of peace. Perhaps events will transpire to prove that Thomas A. Edison was not too far afield when he predicted, "the only textbooks needed will be for the teacher's own use. Films will serve as guide posts to these teacher-instruction books, not the books as guides to the films. Pupils will learn from films everything there is in grades from the lowest to the highest --- Films are inevitable as practically the sole teaching method." (9)

Limits of the study. The motion picture is perhaps one of the most widely used of all the available teaching aids. It is capable of depicting processes, operations, and concepts

... (to American, imported) as conclusively as  
to determine the training, feeling, and setting of an over-  
sightful proposition of the population. Their educational  
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them to be to provide facilities of individual thought and  
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process as soon as all words of education are put in use.  
... (all) continued by showing that common folk  
live. These and enlightenments also follow them. This has  
been illustrated in films produced and used in the world.  
Information, and instructional programs of the past. More  
than ever is there need to mobilize these same resources  
to advance and disseminate the technology and morality of  
science. Perhaps science will continue to prove that science  
is not for the elite when he provided, "the  
his resources needed will be for the common man's use."  
... will serve as guide words to these common-education  
... and the common as guides to the films. Films will  
take from films everything there is to learn from the  
... films are inevitable as practical-  
the sole teaching method." (5)

Value of the study. The value of the study is perhaps one  
the most timely need of all the available teaching aids.  
is capable of depicting processes, operations, and concepts



involving a continuity of sound and movement, and can easily create an illusion of reality. Through the medium of the motion picture, it is possible to show many things not normally visible to the human eye, such as actions which are too rapid or too slow for observation, or objects which are too large or too small to be seen otherwise. Invisible actions can be illustrated by the use of the animated cartoon type of motion picture. (32) However, it must be understood that no amount of precise planning and care in the production of the "ideal" teaching film would be of much avail unless the additional factors incorporated in the ultimate presentation to the student audience are taken into account. Much of the effectiveness of the educational film depends upon the intelligent use of the film in the classroom. The overall quality of an educational motion picture depends upon the degree of the control and supervision by the instructor. If the instructor lacks an intelligent and mature appreciation for the medium, or fails to develop insight into the proper employment of audio-visual aids, he may inadvertently create a negative value for the film's carefully designed portrayal. (52)

Therefore, although it is realized that the very effectiveness of a film depends largely on these relative factors of intelligent presentation, it also becomes apparent that no one factor or principle of film learning behavior can readily





exist independent of the other. An instructional film can hardly anticipate being really effective if the methods and environmental influences of the classroom presentation are to be the only accepted criteria upon which to base motion picture production planning. A consideration of this assumption has provided sufficient merit in the belief that there exist applicable teaching principles which are most pertinent to the producing end of instructional film production to warrant pursuance of the problem as a study isolated from the inevitable teacher utilization. As a consequence, the study has been limited to those particular indices of film learning behavior which should be the direct concern of each and every conscientious producer of valid and reliable teaching film. Furthermore, in view of the considerable number of psychological learning principles currently under observation, a consideration of all of them would be virtually impossible for a problem of this professed scope. Therefore, this study has purposely been restricted to only those major and generally accepted psychological learning principles which indicated the greatest promise for a satisfactory conclusion.

Education through the medium of television has been briefly mentioned. In view of the fact that, in so far as the over-all learning behavior of the general viewing audience is concerned, there is fundamentally little basic difference between viewing a motion picture directly or by video transmission, there is no need to dwell independently

under independent of the other. An individual will live and  
 nearly unnoticed being really effective if the results and  
 environmental influences of the different presentation are  
 to be the only accepted criteria upon which is made action  
 always producing planning. A consideration of this aspect  
 from the provided conditions leads to the belief that there  
 exist applicable learning principles which are more pertinent  
 to the learning and of individual than previously so  
 current purposes of the program as a study isolated from the  
 individual's former education. As a consequence, the study  
 has been limited to those particular features of this learning  
 behavior which should be the direct concern of man and every  
 educational process of valid and reliable learning this.  
 Therefore, in view of the considerable number of experimen-  
 tal learning principles extremely under consideration, a con-  
 sideration of all of them would be extremely impractical for  
 a review of this proposed study. Therefore, this study  
 has purposely been restricted to help those who are  
 actively engaged in experimental learning principles which  
 indicated the present promise for a satisfactory conclusion.  
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 the over-all learning behavior of the general learning  
 behavior is concerned, there is undoubtedly little basic  
 distinction between these a action process directly or by  
 other circumstances there is no need to dwell independently



on the postulate that individuals can learn from television. It should be obvious that if students can learn from a motion picture film they can likewise learn from television. The quality of telecasts is now being improved through the use of motion picture films specifically designed for television. Evidently, the type of information that can be learned from watching the television screen is the same as that which can be learned from watching a motion picture.

(42) In consequence, except in specific, appropriate instances, no further reference will be directed toward television as a factor affecting this study. It can, therefore, be rightfully assumed that contemplations of film learning behavior will apply equally well to television techniques.

## II. THE PROCEDURE

Method of procedure. 1. A detailed investigation of major principles of effective learning established by modern educational procedures was made in order to determine their adaptability to learning through the medium of the instructional motion picture. This was accomplished by a study of the available literature and implemented by psychological and educational courses of study at The Ohio State University.

2. The most adaptable of these learning principles have been applied, with commensurate reservation, to current techniques of instructional film production. This was made



possible through personal experience and training in the motion picture field, a broad review of available literature, and a discerning analysis of the Joint Army, Navy, Air Force Motion Picture Research Project now in progress at the Pennsylvania State College.

3. Conclusions regarding learning through motion pictures has been arranged in such a manner as to arouse possible interest among those producers of educational films who may lack a thorough understanding of the essentials of learning behavior. It is hoped that such a presentation will lead to a comparative consideration of the learning principles of members of the training film industry.

As already intimated, no specific attempt has been made to analyze the techniques for employment of the completed instructional films in a particular teaching situation, nor has any rationalization been directed toward the moral ramifications of presenting propaganda, good or bad, through educational motion pictures. These studies are considered to be of sufficient importance and magnitude to constitute independent research in their own right.



possible through personal experience and training in the  
modern picture field, a broad review of available litera-  
ture, and a disinterested analysis of the total work, 1937.  
The above studies of the various projects are to be placed  
in the Department of the College.

3. Conclusions regarding learning through vision  
studies has been arranged in such a manner as to provide  
possible interest among those persons of educational films  
who are not a thorough understanding of the essentials of  
learning vision. It is shown that such a presentation  
will lead to a cooperative consideration of the learning  
principles of concepts of the learning film industry.

As already indicated, an explicit study has been made  
to analyze the techniques for employment of the completed  
educational film in a particular teaching situation, and  
has any recommendation been directed toward the study  
realization of teaching programs, good or bad, and  
educational action pictures. These studies are scheduled  
to be of sufficient importance and significance to constitute  
independent research to help our field.

## CHAPTER II

### REVIEW OF THE LITERATURE

Long before World War II, schools and colleges used films as aids in academic instruction, but progress was slow in making or using motion pictures in organized education so as to provide broad social orientation, to disseminate important information on social, scientific, and cultural developments, or to influence the moral conduct of both individuals and groups. The most encouraging factors in educational motion picture developments during the war were the magnitude of their employment by the armed services, the effectiveness and efficiency of their distribution, and the significantly broadened and enlarged vision of the scope of their usefulness. The army and navy found that training periods could often be reduced by half for men in practically every branch of the service by teaching them with films. Hundreds of such training pictures were produced, ranging on subjects from bombing tactics to the use and care of rifles, big guns, and airplanes. The development of improved educational film techniques proved profitable in the teaching of surgery and medicine, to the extent that the artistry of the world's best surgeons could be brought to the remotest corners of the world via the motion picture screen. Improved application of motion pictures give doctors everywhere a chance to study the



REVIEW OF THE LITERATURE

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 pictures give doctors everywhere a chance to study the

diseases and sanitation conditions which exist thousands of miles away, in other countries and continents. Of great importance has been the advances made in methods of high-speed photography, and pictures taken through microscopes, thus providing vivid understanding of things heretofore unseen and about which theories could only be postulated. (12)

In Britain the introduction of films into school and university teaching has met a certain amount of resistance from the more conservative teachers and instructors, who feel that visual aids (particularly sound films) will tend to usurp the place of the teacher and lead to the "mechanization" of education. Thus, many of the experiments in the use of films have been designed to show that, properly used, films are valuable aids to teaching. (19)

On the other hand, many teachers and local education authorities have been doing a great deal of individual experimentation in order to find more effective ways of using visual aids in the lesson situation. (19)

Film producers and educationalists in Britain are well aware of the need for fundamental research into the psychology of learning from films, and into the factors involved in making instructional films which will be more effective. The producers of instructional films have also been instigating some experimentations, namely: (1) In trying out films at the rough-cut stage in actual class situations, in order to test the clarity of presentation of the material.

literature and available conditions with other members of  
 other way, in every condition and condition. Of great  
 importance has been the discovery that in order to  
 speed instruction, and learning is not always  
 more effective than understanding of things before  
 them and even when these things could only be presented. (12)  
 In briefly the introduction of films into schools and  
 university learning has not a certain amount of resistance  
 from the more conservative teachers and instructors, who  
 feel that visual aids (particularly sound films) will tend  
 to divert the mind of the student and lead to the "mechanical"  
 nature of knowledge. Thus, many of the experiments in the  
 use of films have been designed to show that, properly  
 used, films are valuable aids in learning. (13)  
 On the other hand, many teachers and local education  
 authorities have been using a great deal of instructional  
 presentation in order to find more effective ways of  
 using visual aids in the lesson situation. (14)  
 Film producers and educationalists in Britain are well  
 aware of the need for fundamental research into the psychological  
 aspects of learning from films, and into the factors involved  
 in making instructional films which will be most effective.  
 The programme of instructional films has also been limited  
 by some experimental research, namely: (1) in trying the  
 films at the present time in actual class situations,  
 in order to test the ability of presentation of the material.



(2) In the insertion of blank spaces in films at appropriate spots so that the projector can be stopped and a discussion take place. (3) In the use of very short films (2-3 minutes) to illustrate a single point. (4) In the insertion of questions in films to provoke thought and discussion. (19)

According to Hoban and Van Ormer (23), more than 200 separate research studies of educational effects of motion pictures have been conducted in the United States and elsewhere. The large number of these studies precludes the feasibility of attempting a detailed summary of each. Nevertheless, in view of the fact that the very large number of motion picture training films produced during the last war have had such a marked affect on the research, production, and employment of educational films, a short review of the results from a few of the more significant wartime film research studies and experiments has been prepared. The summation serves to indicate the broad educational implications of some of the data and subsequent justification in current education.

One of the most interesting studies was that conducted by the Army Air Force in 1943. Concerned with the fact that there existed at the time no accepted guiding principles regarding the subjects in which the motion picture could be expected to give better instruction than ordinary methods, and lacking a body of knowledge relative to the instructional techniques peculiar to motion pictures which gives them an

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advantage over other learning methods, the AAF decided to conduct some experimentation in this area. (15)

An experiment, fairly typical of the scope of the Air Force study, was designed to compare the over-all effectiveness of the training film with that of an illustrated lecture (oral instruction with visual aids) and with the study of an illustrated manual (written instructions with visual aids). The results of the experiment pointed up several special advantages of the motion picture as a training device. Specifically, the portrayal of operating mechanisms; the varied timing of mechanisms; the importance of the subjective (onlooker) viewing angle; consequences of incorrect choices of trainees; realism in training; and personalization of abstract ideas were discovered to be governing factors contributing to the training film's advantage. Notwithstanding, certain inherent disadvantages were made clear. These were principally with respect to such things as personal relationship and guidance which a good teacher can bring into the classroom situation. However, the AAF developed the general conclusion that if films were developed and used along the lines suggested by experimentation and experience, the training film could be a very effective aid to instruction. (15) (16)

The wartime research studies on values of films in the U.S. Army training program were made by competent experimental psychologists. Some interesting and important data were

experiments over many testing periods. The first series of

experiments was conducted in this area. (10)

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compiled which shed light on the import of films in an educational program. Through the use of training films in conjunction with a special training program for teaching elementary reading and arithmetic, more than 90 per cent of the men who entered the army as "functional illiterates" were taught to read and to do elementary arithmetic according to standards defined by educators. (21)

Other interesting data on the relationship of the audience to the amount of learning from a film resulted from studies conducted by the Research Branch of the U.S. Army's Information and Education Division. In one instance, a nature film, in point of view, technique, and concepts, was shown to a group of selectees, which was matched in number, age, and educational background with another group to whom the film was not shown. As a result, it was noted that both the grade school and the high school or college educated selectees learned something from the film, but that those whose educational background included high school or college experience learned more. From the experiments, researchers concluded that the more the audience brings to an educational motion picture, the more that audience receives from the picture. (21)

One of the most significant and far reaching motion picture research programs yet devised has been the Instructional Film Research Project currently being carried on at the Pennsylvania State College under the auspices of the



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One of the most significant and far reaching action picture research programs yet devised has been the National Film Research Project currently being carried on at the Pennsylvania State College under the auspices of the

Joint Army, Navy, and Air Force. The project, actively starting in early 1947, has in the intervening years attempted to give full and undivided attention to a detailed consideration of the basic problems involved in improving the instructional efficiency of motion picture films. Previous attempts at research on instructional sound films have generally failed or ended with inconclusive and unsatisfactory findings because of lack of resources, personnel, and time commensurate with the complexities and difficulties of the problem. (5)

Many unusual problems have confronted the Instructional Film Research Program. Because, as is true in many other fields, there was not a substantial body of well established findings in the area of sound films as instructional and training communication to serve as a base, research had to be started largely from the beginning. Only related fields provided proven methods and procedures for successful comparison. Furthermore, it was difficult to convince persons, other than those who were attempting research in the areas of instructional sound films, radio, and television, of the complexities and difficulties of the problems encountered. Consequently, unnecessary delays were encountered in program prosecution. (5) Nonetheless, the research has continued, despite obstacles, governed by the postulate that, regardless of modifications and exceptions, there is a strong contention

to give full and complete attention to a detailed analysis of the situation in early 1961, not in the late 1960s, when the situation was already very different. The project, however, was not to be completed until the late 1960s, when the situation was already very different.

operation of the device which is involved in improving the  
technical efficiency of machine design. Various  
attempts are made to improve the machine design and  
generally find it to be a very difficult and expensive  
task. The findings of the study of the design process  
and the comparison with the complexity and efficiency  
of the design process.

[illegible]



that the testing of existing principles of motivation, perception, and learning offers the best conceivable approaches and orientations for research on instructional and informational sound motion pictures. (6) The work is still in progress, and insofar as funds and personnel continue to be allotted, the study should continue in force to a successful and indisputable conclusion in the near future.

Jayne, (27) among the more recent investigators, compared the factual learning from lectures for one group of freshman students with the learning from silent films for another group. The subject in either case was general science. Jayne discovered that although the immediate gains from the lectures were higher than those from the films, these differences became less as the time interval increased. Philpott (39) compared the performance of five groups, taught by film only, film plus commentary, slides only, slides plus commentary, and oral lesson, respectively. He found very small differences from the "film only" method. Hall and Cushing (20) employed three methods, specifically, lecture, reading assignment, and films. They concluded that the learning effected was a function of the material taught and of the learner. None of the three methods proved to be consistently better or poorer. It may be concluded, therefore, that, at least for the imparting of factual knowledge, sole dependence on films as teachers is neither impossible nor unrealistic.



The evidence suggests that in mass training programs such a procedure may be both practicable and effective. It would be necessary, of course, to explore its limits in terms of the kinds of subject matter to which it might be applied, and the kinds of learning it might bring about or fail to bring about. (1)



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the kinds of subject matter so which it might be applied,  
and the kind of learning it might bring about as well as

(2)

### CHAPTER III

#### THE AREA OF PSYCHOLOGICAL LEARNING PRINCIPLES AS PERTINENT TO LEARNING FROM MOTION PICTURE FILMS

In general, research authorities who have completed extensive investigations in the field of learning from films support the conviction that systematic theories of learning, perception, and attitude formation constitute the proper frame of reference for orientation in instructional film research. (6) As a consequence, in order for improvements in the quality and effectiveness of instructional films to be made possible, it would seem imperative that those persons responsible for making these films, the script writer, the director, the technical advisor, the cameraman, and above all the producer, be well acquainted with at least a few of the basic principles of learning and the way in which certain film techniques may be used to apply these principles in instructional films. The very nature of the motion picture medium predicates that the thinking, planning, and processing of its adherents be in visual and auditory terms. Furthermore, as non-specialists in the fields of psychology and education, motion picture personnel often find the language of the psychologist and the educator to be obscure for their purposes. In anticipation of this discrepancy, it is believed that by verbalizing some of the basic psychological learning principles, and in turn relating them to





accepted motion picture techniques, educators and film producers will be furthered in their attempts to establish a common vernacular and in their efforts to think in common terms regarding techniques and procedures applicable to the production of effective instructional films. (47)

Since the turn of the century, study in the field of human and animal learning has experienced amazing developments. Mastery of the extensive literature now available, by any single person, would be an herculean task. Any numerical listing of the wealth of empirical data and generalization, of special and general theory, and a variety of points of view and of interpretative systems, would be astronomical in scope. Naturally, when there is a preponderance of theories and interpretations, a certain measure of disagreement results. Many generalizations may be regarded as valid for the present, others must be regarded as tentative and questionable because of the lack of reliable or adequate data, while with some topics no generalizations are permissible due to the direct conflict with the empirical data. (37)

Mendenhall has defined learning as a continuous process in which a change in the behavior or attitude of the learner can be readily detected. "Talk to me about learning and I will show you what I have learned by what I do!". (36)

Therefore, learning can be logically interpreted to be a process of changing behavior by the learner and may be

all the time, and the same is true of the other side of the coin. The only way to get the best of both worlds is to have a good understanding of the other side of the coin. This is why it is so important to have a good understanding of the other side of the coin. This is why it is so important to have a good understanding of the other side of the coin.

Since the days of the company, which is the field of  
mean and actual interest has experienced various changes  
more. History of the extensive literature has various  
by any other means, which is an important fact. and  
unlimited field of the study of various facts and general  
relation, of special and general interest, and a variety of  
points of view and of representative systems, which in  
consequence of the fact. Similarly, when there is a person  
of interest and interest, a certain number  
of different results. Many generalizations may be re-  
ferred to with for the purpose, which may be regarded as  
progressive and possible because of the lack of reliable  
or without data, which with some topics in generalizations  
and generalizations and so the kind of generalization which are essential

*Lysichiton*

...and the results of the investigation are as follows:



further clarified by referring to it as a search for meaning leading to appropriate resultant action. (35)

It is a generally accepted fact that learning, which begins at birth or before, and continues until the disintegration of the organism, is a major developmental dimension of mind. The significance of the concept is widened by the fact that its relevance is not limited to organization and development as general problems of psychology, but extends into many special and applied fields. (37) In view of this extension into other fields a cursory introduction to the characteristics and conditions which determine learning and its rate becomes fundamental in an understanding of its relative importance in assessing the necessary educational value to be injected into the development of an effective teaching motion picture. The experiences of military psychologists have indicated that not only is it desirable to have knowledge regarding a principle of learning at the time training plans are being developed, but that it is also of great importance to demonstrate the actual extent of these factors in the ultimate learning situation. (15) Furthermore, it is very easy for the expert producer, especially if he is not thoroughly familiar with the particular training skill which he is required to depict, to overlook a detail which has an important bearing on the application of the principles of learning to that specific training situation. Moreover, the accurate portrayal of the application of these principles is



Further elicited by reference to it as a means for reaching  
leading to systematic scientific study. (191)

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into many special and applied fields. (192) The view of this  
extension and thus a survey introduction to the  
characteristics and conditions which determine learning and  
the role of learning in an organismic approach of the psy-  
chological approach is necessary for the necessary understanding of the  
to be obtained from the development of an effective learning  
action process. The significance of effective psychological  
learning is that not only is it determined to have knowl-  
edge regarding a particular of learning is the idea of learning  
which are being developed, but that it is also of great  
importance to understand the actual extent of these factors  
in the organismic learning situation. (193) Furthermore, it is  
very easy for the expert student, especially if he is not  
sufficiently familiar with the various training fields which  
he is required to learn, to receive a detail which can be  
important either as the application of the principles of  
learning to some specific training situation. However, the  
actual purpose of the application of these principles is

likewise very important from the point of view of convincing less technically trained individuals in the audience of the effectiveness of these principles in the situation involved. Consequently, it becomes apparent that a study of some of the learning principles will serve to indicate areas in which research on instructional motion pictures might be profitably conducted. (46) (15)

Inasmuch as so many of the problems relating to instructional films appear to be closely related to one or more of the learning principles, this chapter will introduce selected principles and hypotheses of effective learning, each of which might be applied (and certainly some, with more or less systematic intent, have been applied) to instructional films. A later chapter will attempt to relate the effectiveness of certain of these principles directly to the motion picture medium. There is no assurance, however, that principles of effective learning as currently formulated and derived in non-film situations can be directly carried over and applied to instruction by films; in fact it is almost certain that this cannot be universally done. Neither can a learning principle revealed in the use of a particular film be transferrable, without verification, to other films or classes of films. (46)

...very important from the point of view of comparing  
...individuals in the various of the  
...of these individuals in the various, involved.  
...it is not possible to say that a study of some of  
...the learning experience will be in the future, but in  
...which research on individual learning might be  
...possibly conducted, (44) (11)

...as no way of the process relating to learning  
...this time is to be clearly defined as an end in  
...the learning experience, this chapter will introduce a new  
...principles and objectives of individual learning, such as  
...which might be applied (and certainly some, with which to have  
...specifically related, have been applied) to instructional film.  
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...details of these principles directly to the various phases  
...action. There is no assumption, however, that principles of  
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...to instruction by film; in fact it is almost certain that  
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...technique revealed in the use of a particular film is ques-  
...tionable, almost certainly, in other films or classes of  
...films. (45)



## I. MOTIVATION AND INCENTIVES

One of the most widely accepted of the general principles regarding learning is that interest and motivation are essential for efficient learning. (15) Competent scholars may differ on details of how motivation acts in learning, but probably all will agree that it is one feature of the learning process. (37) Indeed, incentive, urge, drive, need, set, or whatever name is applied to denote the motivation of the learner, is necessary for any complex acquisition of knowledge. (46) Motives direct activity during practice and define satisfactoriness of the subject's response. They represent a release of energy expressed in an increase of the subject's general level of activity. (37) Within limits, the more intense the motivation the greater will be the learning. (46)

In order to fully understand the import of this major precept, motivation, several lesser factors must be clearly revealed. Primarily, the goals to be achieved in the learning process will serve to strengthen motivation in direct proportion to their clearness to the learner. Certainly, learning is favored by an initial definite statement of the overall goal and by specific statements of the goals of each learning period, in brief, what the learner is expected to learn. However, goals are almost never accepted on face value alone. On the one hand, they must be accepted by the learner

# THE EFFECTS OF THE INSTRUCTION

One of the most likely sources of the general principle  
 this regarding learning is the fact that the subjects are  
 presented for a limited duration, (15) compared with the  
 way after an interval of time and the results are in fact  
 not markedly different from those of the first session of the  
 learning process. (16) Indeed, sometimes, more, more, more,  
 and, on occasion, more is applied to denote the retention of  
 the learning, is necessary for any complex acquisition of  
 knowledge. (17) There is a direct effect of learning on the  
 behavior and the retention of the subject's response. They  
 represent a release of energy expressed in an increase of  
 the subject's level of activity. (18) It is in fact,  
 one who knows the solution the greater will be the  
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In order to truly understand the impact of this subject  
 concept, motivation, several factors must be clearly  
 revealed. Firstly, the goal to be achieved in the first  
 few years will have to be achieved in the first  
 proportion to their readiness to the learner. Certainly,  
 learning is based on an initial relative statement of the  
 overall goal and of specific statements of the goals of each  
 learning period. In order, what the learner is exposed to  
 learn, however, goals are almost never accepted as the same  
 alone. On the one hand, they must be accepted by the learner

as desirable to achieve, while on the other, the goals must be attainable. This must be aided by a positive suggestion that the mastery is possible or probable. Consequently, with reasonable effort most learners should be able to achieve the goal established. Perhaps in attaining an ultimate goal it may become desirable to set successive sub-goals in order that interest may be sufficiently maintained. (46) If a learner knows he is to be held accountable for a certain amount of achievement, he will continue to apply himself. (8)

Closely associated with the establishment of a purpose, is the general importance to the learner of the knowledge of his progress. When the learner is informed of his progress from time to time, motivation is usually sustained and fortified. (46) When a trainee makes progress, he is stimulated to greater effort and accomplishment. Directly related to progress are the factors of praise and reproof. Everybody wishes to succeed. Success is gratifying and encourages continued effort. Satisfaction and accomplishment develop and hold interest. A feeling of satisfaction is essential to the learning process. (8) Praise for correct answers or for a good performance is frequently more motivating than reproof for a poor performance. A wise use of praise or reproof takes into account the make-up of the individual learner, his reaction under similar previous conditions, and the lasting influence of the praise or reproof on his learning attitude. (46)





Of particular importance to a fundamental consideration of learning motivation and the motion picture medium is the factor of realism and practicability which should result in a directing of the learner's anticipation for an early use of his knowledge. Motivation to learn is supported when the material is presented in a realistic way, and in such a manner as to make clear the practicability of the material and the way in which it is actually employed in practice. Concomitantly, motivation is invigorated when the learner is led to anticipate a use for the material in the near future.

(46) An individual will learn more quickly and retain longer those things for which there is an immediate need. Moreover, human beings are so constituted that in emergencies they can perform above the usual expectations. There have been cases in combat areas where men have learned a new type of work in a few minutes or a few hours time, when it would ordinarily have taken days or even weeks. There can be no doubt, then, that when a person sees an immediate need for some knowledge or skill, learning for him becomes relatively simple. (8) (28)

Competition provides another governing factor in the phenomenon of motivation. When properly aroused and defined, the spirit of competition becomes an effective motivating force in learning. Competition adds interest, brings about whole-hearted participation, and affords valuable training in cooperation. (8) Similarly, an instructional presentation will motivate learners if it involves a challenge rather than





a note of finality; it lends impetus to the learner's desire to seek finer details of the generalization presented. (46)

Finally, but of no small influence on motivation, is the examination set. However, this force should be left open to question inasmuch as there are too many governing factors which affect it. Examination types, presentation conditions, scoring, validity, reliability, and item choice all constitute details too elaborate to consider at this time. Furthermore, inadequate examinations tend only to motivate the individual momentarily, as in "cramming", which probably has a learning retention approaching zero in value. Nonetheless, regardless of the learning retention criterion, it must be pointed out that if a person has knowledge that there will be an examination on the material presented to be learned, this fact generally has the effect of strengthening motivation. (46)

## II. SELF ACTIVITY

Closely related to interest and motivation is the principle of purposive student activity. A trainee must be activated if he is to learn (8) What he learns are the responses, mental or physical or both, which he makes and organizes. (46) Any procedure which requires active response is more efficacious than mere exhibitions, displays, or other visual aids in which the learner remains passive. (15) Mental practice of a process, verbalizing, visualizing, and imagining the feel of a task, these are the activities which enhance



learning. (46) Skills and operations should actually be performed, insofar as it is possible, in the learning process for there is no controversy: One learns best through first-hand experience. (35) Learning by doing expresses a fundamental principle of training. (8)

### III. SEEING AND ORGANIZING RELATIONSHIPS

Dale (11) has said: "Experiences are pearls of knowledge, but one must have the string of understanding to hold them together or there can be no permanent meaning"; and "One can see as far into a generalization as his knowledge of the details extends." Generally, a learner has a certain tendency to visualize and organize patterns or relationships in the material or activities which he is learning. Unfortunately, this tendency cannot be trusted to form the desired relationship unaided. In order for effective learning to take place this organizing process must be directed and facilitated. Therefore, it can be pointed out, that the ability to see and organize relationships becomes a very important principle in the learning process of individuals. (46)

One of the most potent categories contained in the seeing and organizing relationship is that which encompasses meaningfulness. Whether meaning is defined as associative value or in some other way, the meaning of materials learned is a much greater determiner of the rate of their learning than are such characteristics as size or color. When a learner





discovers that the meaning of a material is not readily available to him, it is possible for him to accelerate his learning rate by a search for meanings, by the imposition of rhythm and pattern, by new groupings of the items, by noting spatial relations, and by other methods whereby he may change the material into something with more immediate meaning and thus assimilate it more easily into his already existent patterns of response. Although not necessarily universal in need, this use of the "logical" method is commonly superior to the rote method. Research has revealed that subjects differ considerably in the extent to which they employ a logical method on material which permits its use. Actually, the relative effectiveness of the two methods may be considered as a function of the specific materials practiced and of the habits and other characteristics of the learner. For the individual habituated to the rote method, any attempt, at least initially, to employ a logical method might conceivably retard learning. On the other hand, an attempt to apply the logical method to material little susceptible to it might be less effective than rote learning. (37)

The assumption that a high positive correlation exists between meaningfulness of material and rate of learning seems to hold under a very wide range of conditions. Furthermore, the greater effectiveness of the logical rather than of the rote method appears to hold over almost as wide a range. From these considerations, it is possible to imply the generality

However, that the method of a material is not really  
 available to him, it is possible for him to be aware of his  
 learning that he is not really for himself, by the knowledge of  
 together and together, by the knowledge of the same, by using  
 special relations, and by other means which in any  
 thing the material into something else with immediate mean-  
 ing and that material is more really to be his already  
 existing pattern of response. Although not necessarily  
 universal to him, this one of his "logical" relation is not  
 really superior to the other method. However, he is not  
 that subject with consciousness in the sense of which  
 they enjoy a logical method on material which is not  
 yet. Actually, the relation effectiveness of the two methods  
 may be considered as a function of the specific material  
 presented and of the habits and other characteristics of the  
 learner. For the individual subjected to the same method,  
 any attempt to learn initially, to enjoy a logical method  
 might completely reverse itself. On the other hand, as he  
 goes to apply the logical method in material which is  
 able to be able to learn effectively with some learning. (iv)  
 The statement that a high positive correlation exists  
 between effectiveness of material and rate of learning seems  
 to hold under a very wide range of conditions. For instance,  
 the greater effectiveness of the logical method than of the  
 rote method appears to hold over almost as wide a range. For  
 these considerations, it is possible to judge the generally



of positive transfer, and to suggest that learning is not a passive chaining of adjacent items, but requires instead an active, analytic mode of response. (37)

Consequently, it becomes easily apparent that the more meaningful the material is to the learner, the more readily it is organized and learned. Notwithstanding, as has been pointed out, meaningfulness should be aided by other relative factors if the proper organizing relationship is to exist for the learner. In order for meaningfulness to be enhanced, all unfamiliar and technical terms, when necessarily used, must be explained to the learner in simple words that are familiar to him. (46) Inasmuch as learning that is rooted in past experience proceeds rapidly, (35) the necessity of relating new material to the learner's past experience by illustrations and by analogies needs no further emphasis. In view of the current trend toward the organismic or "whole" approach to learning in which it is considered better to have an understanding of the entire program (goal) before treating the parts, (36) a preliminary overview and introduction of the whole pattern of the material or process to be learned becomes highly essential if meaningfulness is to be preserved.

Military psychologists have concluded that the learning of a skill having only superficial resemblance to that for which the individual is to be trained may contribute nothing or even produce habits of interference with respect to proficiency in handling combat-type equipment in combat situa-

of positive results, and to suggest that feeling is not a passive condition of judgment alone, but requires instead an active, analytic mode of response. (27)

Consequently, it becomes easily apparent that the sense-implication of the answer is not the answer, but the feeling is in organized and focused. Holisticness, as has been pointed out, meaningfulness cannot be aided by other relative factors if the proper organizing relationship is to exist for the answer. In other words, meaningfulness is not achieved, all potential and technical sense, when necessarily used, must be explained to the answer in a way which must be similar to the (14) answer as stated that it is not in itself between persons really. (28) The necessity of relating the material to the answer's past experience by elimination and its analysis seems no further necessary. In view of the answer itself, sense and organization in "sense" appears to be feeling in which it is considered better to have an understanding of the entire process (29) before stating the sense, (30) a preliminary overview and introduction of the whole picture of the answer or process to be learned becomes highly essential if meaningfulness is to be preserved. Military psychologists have concluded that the learning of a skill being only superficial relationship to that skill when the individual is to be placed in a complex situation on even greater basis of experience with regard to the feeling in feeling sense-type equipment in which sense-



tions. (15) Therefore, in aiding meaningfulness, it becomes necessary to have equipment or processes shown to the learner in the same relative position which these would have been viewed by him in actual practice or use. It is equally important that there be adequate emphasis on essential details or features and omit learning of material that can only be construed as "busy-work". Undoubtedly, meaningfulness will increase in potency with thorough and clear explanations of reasons why things should be done. Care must be taken, however, not to create monotony and a lack of interest through unnecessarily detailed illustrations. In like manner, the learner wishes to know how things operate; certainly his search for meaning warrants an explanation of how a mechanism works. There should be an awareness, though, of the danger of too extensive an explanation early in learning. Only that which is essential for a given level of training should be the accepted criterion. Finally, the enhancement of general meaningfulness for the learner will come through reviews or summaries after logical units of material during each period of presentation, and of course, at the conclusion of the complete or entire presentation. (46)

In education, the making of suitable classifications of individual experiences is generally termed concepts. The acquisition of concepts is a natural process from early childhood when certain conclusions are drawn from experience and applied to a new situation. It continues thereafter as new





generalizations are made from new experiences and from experiences in which new and old are combined. Because classifying of experiences proceeds in school and out of school, the over-all activity of concept building is a realistic definition of education. Whenever a person learns something new and uses this new something, he is building or refining a concept. Briefly, then, a concept summarizes a group of a person's past experiences. The summary may be highly refined or crude, highly differentiated or gross. Therefore, in any educative process, the goal should be to make individual concepts more accurate and more generally useful. (9)

However, to have a concept become useful and accurate, the learner must grasp the meaning. Meaningfulness in the case of concepts will be more firmly grasped through new and varied experiences in the presentation of diverse, specific, realistic situations in which concept is illustrated and named. (46) Consequently, it is necessary that in selecting training equipment and materials, a systematic check be made to insure that the training devices simulate the real equipment and situation in all important aspects. (15) The value of employing simple terms and words has been previously stressed. Nevertheless, in certain instances of learning complex materials, the use of symbols will be unavoidable. In order not to be a detriment to meaningfulness, it is important that symbols be simplified, and that they remain within the

generalization may make two hypotheses and then in-  
 formation in which one and one decision, "deciding"  
 classifying of hypotheses presents in which one and one  
 action, the overall utility of concepts defined in a  
 possible relation to decision. However a person learns  
 something but not give this new something, it is learning or  
 between a concept. Finally, then, a concept involves a  
 group of a person's past experiences. The memory may be  
 slightly revised or even, slightly misinterpreted or false,  
 however, in any subsequent process, the goal should be to  
 make individual concepts more accurate and more generally  
 useful. (17)  
 However, to have a concept which is useful and accurate,  
 the learner must grasp the meaning. The concept must be in the  
 form of concepts will be more likely to be learned than and  
fixed experience in the presentation of objects, symbols,  
 relations themselves is which concept is illustrated and  
 more. (18) Consequently, it is necessary that in teaching  
 meaning concepts and relations, a systematic plan be made  
 so that the learning device should be the real thing-  
 that and attention in all important aspects. (19) The value  
 of employing single facts and words has been previously  
 discussed. Nevertheless, in certain instances of learning con-  
 cepts necessary, the use of symbols will be unavoidable. In  
 order not to be a teacher to meaningless, it is important  
 that symbols be explained, and that they remain within the



span of the learner's experience. (46) However, the learner must have a chance to verify the representation of the symbols. The greatest possibility for him to develop his insight is offered by his ability to use laws he already knows, laws which will explain and give meaning to this new phenomena the learner is encountering. An essence of learning is to allow the learner to perform a verification experimentation in every new learning situation. (34)

Finally, meaningfulness for the learner in the case of concepts will be further enhanced through personalization; a representation of concepts by human or cartoon characters, and through contacts and similarities which clearly indicate differences as well as likenesses among concepts. (46)

Although the foregoing has laid considerable stress on the principle of meaningfulness, meaning is not necessarily derived solely from the learning of verbal materials. Many learners express a perceptual-motor problem, such as a maze, in terms of meaningful relations appropriate to the problem. They deduce the correct path from a verbal chart by which they guide their movements, they note spatial relations, and in varied ways construct a meaningful pattern. The specific meanings tend to differ from those related to verbal materials, but their basic character appears to be much the same. Learners who employ the more verbal and meaningful methods of approach, learn a maze more rapidly than do those who

that of the Japanese revolution. (2) However, the Japanese  
must have a chance to verify the representation of the sym-  
bol. The greatest possibility for him is leaving his in-  
sight is offered by his ability to see how he already knows,  
how which will explain and that meaning to this one person-  
and the future is encouraging. An aspect of leaving is  
to allow the future to provide a verification organization  
in every one leaving situation. (3)

Finally, meaningfulness for the future in the case of  
examples will be further enhanced through generalization a  
representation of images of human or human objects,  
and through contents and structures which already include  
difficulties as well as themselves being images. (4)

Although the foregoing has laid considerable stress on  
the principle of meaningfulness, meaning is not necessarily  
entirely solely from the learning of verbal materials. Any  
future success a hypothetical-actual problem, such as a man,  
in terms of meaningful relations appropriate to the problem,  
They reduce the current pain from a verbal aspect of action

may have their movement, they have spatial relations, and  
in various ways themselves a meaningful picture. The American  
means, then to differ from those related to verbal inter-  
ests, and their basic operations located to be much the same.  
Learning was enjoyed the more typical and meaningful words  
of experience, learn a sense more readily than to know one

employ a "motor" method, "following the lead of their hands", without utilizing a pattern of representative devices. (37)

(41)

Such processes are not radically different from the logical method in verbal learning. In both cases the individual seeks to organize meanings in order, thereby, to control overt response. The pervasive presence of representative devices and the meaningful relations in the learning of perceptual-motor acts emphasizes the universality of meaning. (37)

It can be seen, therefore, that a patterning response forms an essential bond in the seeing and organizing relationship of the learner. Moreover, organization and learning are facilitated when the material is grouped into patterns in presentation. Such patterns could be defined as, functional patterns (as the three interfunctioning parts of a gun), spatial patterns (as represented by a grouping of instruments on a panel), temporal patterns (as the rhythm in complex movements, such as a gun loading exercise), and logical patterns (as illustrated by the precautions in ammunition rooms to avoid sparks, logically related because of an ever-present common hazard). (46)

The effectiveness of rhythm, as illustrated by temporal patterns, probably results in part from the way in which it assists in organizing the material into units which are readily perceived together, in part from the accent it gives



employ a "motor" method, "following the lead of local bands",  
 without utilizing a system of progressive exercises. (27)

(28)

Such movements are not radically different from the  
 logical method in vocal training. In both cases the indi-  
 vidual needs to organize materials in order, thereby, to  
 control overt responses. The cognitive processes of reason-  
 ing develop and the resulting relations in the learning  
 of psychomotor-motor and cognitive are underlying of some-  
 ing. (29)

It can be seen, therefore, that a balanced response  
 forms an essential part in the seeing and organizing rela-  
 tions of the learner. However, organization and learn-  
 ing are facilitated when the material is grouped into  
 patterns in presentation. Such patterns could be defined as  
functional patterns (as the above interlocking parts of a  
 clock), logical patterns (as recommended by a grouping of  
 instructions as a result), musical patterns (as the parts  
 in complex movements, such as a gun loading exercise), and  
logical patterns (as illustrated by the movement of a  
 vision needs to avoid errors, logically related because of  
 an error-prone common factor). (30)

The effectiveness of rhythm, as illustrated by musical  
 patterns, probably results in part from the way in which it  
 assists in organizing the material into units which are  
 readily perceived together, in part from the extent to which

to certain words or serial positions which makes them stand out as reference points, and in part from the fact that it assists an active attitude on the part of the learner. (37)

In order for a learner to function effectively in response to a learning stimulus, he must be able to separate the situation stimuli from others in close relationship. The principle of the seeing and organizing relationship in learning is consequently assisted by identifiability. A learner's responses to a situation are easier for him to understand and to learn as the situation is more easily identifiable, or distinguishable from others. This can be illustrated by the responses required, for example, in assembling four similar parts of a gun trigger mechanism. (46)

#### IV. THE PRINCIPLE OF EFFECT (reinforcement of responses)

Psychological research has demonstrated that the frequency of response to a learning situation without effect (knowledge of right or wrong) is a condition of little, if any, learning, while frequency of response with effect leads to relatively rapid learning. Effect can be interpreted to mean that which happens as a consequence of an act, usually that which happens within a very few seconds after it. (37)

An inquiry into factors controlling conditions which lead an individual to avoid certain conditions and not to avoid others, produces the concept of motivation. Other things being equal, acts leading to consequences which satisfy a

to certain words or verbal positions which would then stand out as distinctive marks, and in part from the fact that it is based on native reactions on the part of the learner, (17) in other words a learner of French is effectively in possession of a learning situation, in that he is not only the situation itself from which he gains his knowledge, but the possibility of the seeing and organizing relationships in learning is increasingly assisted by illustrations. A learner's responses to a situation are easier for him to understand and to learn as the situation is more easily identifiable, or distinguishable from others. This can be illustrated by the responses received, for example, in answering the question part of a test without rehearsal. (18)

#### IV. THE RELATIONSHIP OF EFFECTIVE REINFORCEMENT OF RESPONSES

Psychological research has demonstrated that the tendency of responses to a learning situation which elicit (knowledge of what is wrong) is a condition of learning. It is, therefore, with frequency of response with effect that we are concerned. Effect can be interpreted as the relatively rapid learning. Effect can be interpreted as the fact which appears as a consequence of an act, usually that which happens within a very few seconds after it. (19) An inquiry into the nature of learning conditions which lead to reinforcement in words would lead one not to avoid others, provided the concept of reinforcement. Other things being equal, we are looking for reinforcement which leads to



motivating condition are selected and strengthened, while those leading to consequences which do not satisfy a motivating condition are eliminated. (37)

The interdependence of motive and effect should be made clear. Motivation without effect leads only very slowly to learning, as experiments on response frequency have shown. Conversely, effect without motivation is powerless, or nearly so. If a subject had no motivation to seek right and avoid wrong as consequences of his responses, he would be without a standard by which to differentiate between them, and one consequence would be as acceptable as the other, neither being selective. Experiments on incidental learning, where the subject is not formally motivated but receives some consequences from his responses, constitute the closest approach to such a situation. (37)

Therefore, a broad definition of the so-called, "law of effect" reveals that students will learn more quickly and tend to repeat those things that give them satisfaction. (8) Furthermore, in much learning, a selective process occurs in which the individual is predisposed to acquire and repeat those actions which have elicited one or more of the following: (a) led to success in that situation, (b) gravitated toward a satisfaction of the motivating conditions, and (c) been perceived as means to desired ends. Moreover, unsuccessful or annoying responses tend to be avoided and promote a shift in the learner's activity to other actions

motivating condition was removed and subsequently, with

these leading to responses which do not reflect a

condition of extinction (197).

The relationship of motive and effort during the

work phase. Although an attempt to make only one

study is necessary, an experiment on response frequency

was shown. Generally, effort which is related to power

level, on nearly all, it is subject to no motivation to work

which and would work as a consequence of the response, so

which is subject to a subject by which is different in

times that, and the consequence would be as a consequence as

the other, either being relative. Experiments on last-

which leading where the subject is not formally motivated

but receive some consequences from his responses, which-

the the almost appears to make a situation. (197)

Therefore, a third definition of the "motive" is

of effort" reveals that subjects will learn more quickly

and tend to repeat those things that give them positive

flow. (197) Furthermore, in such learning, a relative response

occurs in which the individual is prepared to respond and

repeat those actions which have yielded the greatest of the

following: (a) led to success in past situations, (b) great-

which would a relationship of the motivating conditions,

and (c) been learned as a result of learning. However,

unsuccessful or negative responses tend to be avoided and

present a shift in the subject's attitude to other actions

which may conceivably lead to success. Some reference has already been made to the relationship of right and wrong responses to the principle of effect. Nevertheless, in order for the fullest operation of this principle to take place, it becomes desirable that there be a checking or a "confirmation reaction" of the correctness of the successes in the mind of the learner. Once the right method is at least partially established, a vivid demonstration of the wrong method will reinforce the right method, provided the consequences of the wrong method are stressed. (46) (24)

On the basis of these considerations and in view of the previous discussions on learning, it can be concluded that motive and effect, as conditions of learning, depend on each other. A motivating condition orients the individual in a given direction and sets the stage for a definition of the adequacy of his acts, but this definition cannot appear in the absence of consequences which satisfy or fail to satisfy the motive. Attainment of an incentive object or failure to obtain it constitute a large part of the consequences of motivated acts. (37)

#### V. PRACTICE AND/OR REPEATED PRESENTATION

McGeoch (37) has stated that there are wide variations in the extent to which a subject depends on the direct stimulus pattern of the material being practiced. In the process of memorizing a list of words, two extremes can be considered.



which may conceivably lead to success. These relations are  
 already known to be the relationship of right and wrong  
 responses to the principle of effect. Nevertheless, in  
 order for the theory of action of this principle to be  
 clear, it is necessary to show that there is a connection or a  
 "conditioned relation" of the consequences of the responses  
 in the mind of the subject. Thus the right method is to  
 first carefully establish a valid demonstration of the  
 wrong method will reinforce the right method, provided the  
 consequences of the wrong method are reversed. (24) (25)

On the basis of these considerations and in view of the  
 previous discussion on learning, it can be concluded that  
 positive and negative reinforcement are learned, based on each  
 other. A reinforcing condition operates the individual in a  
 given situation and sets the stage for a definition of the  
 nature of the act, not only defining wrong responses but  
 the absence of consequences which result in failure to learn  
 by the subject. Statements of an individual's object or failure  
 to obtain is usually a large part of the consequences of  
 repeated acts. (26)

#### V. ACTION AND REACTION

Behavior (27) has been shown to be the result of  
 the action of which a subject responds to the direct stimulus  
 the nature of the initial belief involved. In the response  
 of reacting a list of words, two responses can be considered.

One extreme would be represented by complete dependence of the learner on the stimulus pattern where he repeats each word as he perceives it, but does not attempt to anticipate any word or to recall before it is actually presented. At the opposite extreme, beginning with the second presentation, the learner attempts to recall as much as possible of the material without having it presented to his receptors. Between these extremes, lie innumerable combinations of presentation and independent recall. Experiments have developed a conclusion for verbal materials which specifies that some degree of recall (or recitation) with prompting during practice is a more effective condition of learning than is presentation alone.

An effective presentation, like an actor's performance, demands practice. Practice creates a habit which in turn governs a smooth and easy performance. Practice gives the subject selfconfidence by providing him with a strength of belief that his new "habit" will not let him forget anything about the procedure. (2) However, mere practice or repeated presentation of material has very little, if any, strengthening effect upon learning. Repetition apparently simply affords the opportunity for strengthening or weakening factors to create an affect on the learning process. (16)

At one time there was in existence a prevalent belief that repetition was the panacea for all learning. In practically every case where research studies have attempted to





determine the residue of learning, a lack of retention of material acquired through the repetitive procedure has been revealed. This does not, however, remove the necessity for practice. (35) Nonetheless, with other factors in a state of equilibrium, the progress of learning will depend upon the frequency of the repetition under favorable conditions. These conditions would involve such important principles as motivation, effect, and meaningfulness. Furthermore, retention is favored, if in the initial learning, the material is practiced or repeated in presentation beyond the point of its being barely learned. Caution should be observed in the repetition or continuation of practice or presentation beyond the level where fatigue or boredom seriously occurs inasmuch as it may produce a negative effect upon the learning. A varied repetition, or a variation of non-essential details, tends to off-set fatigue and boredom. (46)

The whole-part problem is not one lending itself to an easy generalization. It has a major value, in the present state of knowledge, in the way in which it illustrates the complexities resulting when one set of phenomena, the time-length relations of separate parts, is combined with another, the time-length relations of those parts combined into a whole. (37)

An advantage of the part method lies in its ability to subdivide the material into small and relatively easier units. The whole method has the advantage of obviating the

definition and relation of learning, a lack of relation of  
 methodological approach and the relation of learning has been  
 revealed. This does not, however, mean that the relation of  
 learning, (55) is not a relation, with other factors in a state  
 of equilibrium, the progress of learning will depend upon  
 the frequency of the relation under various conditions.  
 These conditions will involve such important variables as  
 motivation, effort, and reinforcement. Furthermore, the  
 relation is involved, it is the initial factor, the relation  
 is presented or repeated in presentation upon the basis of  
 the factor being learned. Certain knowledge is concerned in the  
 repetition or reinforcement of knowledge or reinforcement of  
 knowledge. The level of learning or knowledge is not only  
 known as it may produce a negative effect upon the learning,  
 a worst repetition, or a violation of non-economic details,  
 would be affected learning and knowledge. (56)

The whole-part problem is not one learning itself is an  
 easy generalization. It has a major value, in the present  
 state of knowledge, in the way in which it illustrates the  
 complexity of learning. It has not been shown, the whole-  
 part relation of separate parts, is involved with another,  
 the whole-part relation of whole parts combined into a  
 whole. (57)

In addition to the part-whole idea in the ability to  
 subdivide the whole into parts and relatively easier  
 whole. The whole system has the advantage of working the

time lost in connecting previously learned individual parts, of giving the subject a greater opportunity to grasp the interrelations of the material, and of distributing the responses to any given item. Practically, it should be possible to employ the whole method with special attention to the repetition of difficult or important parts as learning progresses, thus combining the whole method with a form of the part method. (37) Notwithstanding, the relative effectiveness of a whole-part-whole learning sequence in practicing, versus learning the parts and then combining them, depends upon the degree of integration, difficulty, and length of material, and upon the ability of the learner. Specifically, if a task should prove too difficult, or too long, to be learned efficiently as a unit, it may be desirable to break it into meaningful units, still stressing relationship to the whole. (48) Generally, a relatively mature and practiced individual will find the whole method the more effective. (37)

Realistic practice is an influential factor in the mastery of a learning procedure. Consequently, it is usually advisable to practice an activity, as nearly as is feasible, in the manner in which it will be used or needed in the future. Moreover, under many learning conditions such practice will be favored when practice periods are spaced over intervals of time rather than massed together. In similar vein, the sooner the practice follows the instructions, the





greater the positive effect on the learning. Immediate imitation of movements while viewing them may be desirable, provided that such activity does not distract from the observation of the movements being demonstrated. Consideration should also be given to adequate reviews. In general, well motivated reviews of material or processes are beneficial to learning. (46)

A listing by McGeoch, (37) of some of the basic variables underlying the effectiveness of the relatively larger amounts of recall during practice provides a practical conclusion to a consideration of the learning principles involved in practice and/or repeated presentation. He specifies the following: (1) Recitation furnishes the subject with progressive knowledge of results. This information (a) acts as an incentive condition, (b) brings the law of effect directly to bear, (c) favors early elimination of wrong responses, and (d) by informing the subject which items have been learned, promotes a more effective distribution of effort over the material. (2) Recitation favors articulation of the items and leads to the utilization of accent and rhythm. (3) In recitation the subject is practicing the material more nearly in the way in which it is to be tested and used--that is, without direct stimulation from the copy. It constitutes, therefore, a more immediately relevant form of practice. (4) Finally, it likewise promotes a grouping of the items, localization in the series, and the search for meaning-

should also be noted as valuable review. In contrast, well

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A listing by volume (IV) of some of the birds which

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in practice and the various representations of the system are

6. *Conclusions*

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more widely in the pop. in which it is to be tested (see note 1).

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It was not until 1964 that the first of these was published.

Received 16 January 1992; accepted 16 January 1992

1944. Population in the United States and Alaska for 1944.



ful connections.

## VI. GENERALIZATION, APPLICATION, OR TRANSFER

Learning is a process of forming these meaningful connections and associations just previously discussed. (32) Each new association is learned in the setting of all related ones which have been retained from the past (37) A large number of relations between the old and the new makes for positive transfer and more rapid learning. (37) The rate of learning is also increased by the ability to generalize these associations and to apply them to new problems. So important is this condition of rate of learning that it ranks high among the conditions of learning, in most cases outranking all others except the effect of the act. (37)

## VII. CHARACTERISTICS OF THE LEARNER

All of the foregoing principles of learning may be adequately satisfied, but learning, whether it be the fixation of a verbal series, the establishment of a conditioned response, or the discovery and fixation of the solutions of perceptual motor and rational problems, may not proceed as anticipated. It is here that the inescapable variable of individuality makes its presence felt. Individuals respond and react to learning experiences in their own unique way. (32) The individual responses result from what are known as individual differences, some of which are innate, some acquired.

## VI. INTERNATIONAL AGREEMENTS ON TEACHING

Teaching is a process of learning that involves the

teacher and the learner (1971, p. 100)

has been recognized as a process in the teaching of all related

some cases have been revised from the past (1971, p. 100)

number of factors between the two and the two are not

possible between the two (1971, p. 100)

teaching is also influenced by the ability to understand the

assessments and to apply them to new problems. The important

in this section is that of learning that is very high

among the conditions of learning. In some cases, however,

all other things are equal to the end (1971, p. 100)

## VII. CHARACTERISTICS OF THE LEARNER

All of the following principles of learning may be ap-

plied to learning, but learning, whether it is the learning

of a skill or the learning of a concept, is a process of

learning, in the discovery and learning of the nature of

personal action and personal problem, not of the nature of

learning. It is the nature of the learning process that is

important, since the process is the process of learning

and there is learning, regardless of the nature of the learning

the individual receives from the learning process (1971, p. 100)

actual learning, some of which are learning, some are not.

Three of the more obvious divergencies are the inevitable factors of sex, chronological age, and mental ability or test intelligence. These three produce varying changes in the rate of learning. (37)

A number of experiments reveal that the direction and amount of sex differences in learning are a function of the material being learned. (37) The differences existing between the sexes in physical and social training make it reasonable to expect differences in the appeal of the material to be learned and reduces those differences to ones of motivation and of prior training. (37)

Chronological age, or length of time lived by an individual, cannot itself be a determiner of learning, but it can be regarded as a useful symbol for the complex condition which age brings with it. (37) "The increase in rate of learning with age over the years to early maturity, its relative constancy during the next decade, and its slow decline thereafter appear over a very wide range of conditions and are among the more general facts of the psychology of learning." (37)

A discussion of the relation between rate of learning and chronological age has already been made. Now an inquiry into the correlation between rate of learning of a particular material and some standard measure of intelligence, when the influence of chronological age is as nearly as possible a constant, is in order. Garrett, De Weerd, Kirkwood, Conrad



There of the more obvious differences are the following factors of sex, chronological age, and mental ability on test intelligence. There have been many studies in the case of learning. (27)

A number of experiments reveal that the direction and amount of sex differences in learning are a function of the material being learned. (28) The differences existing between the sexes in logical and verbal learning are responsible to extent differences in the appeal of the material to be learned and reduce those differences to some of logical and verbal learning. (29)

Chronological age, or length of time lived by an individual, cannot itself be a determinant of learning, but it can be regarded as a useful symbol for the complex condition which age brings with it. (30) The increase in rate of learning as age over the years is early maturity, the rate rises somewhat during the post-adolescent, and the rate declines thereafter again over a very wide range of conditions and age among the more general facts of the psychology of learning. (31)

A discussion of the relation between rate of learning and chronological age has already been made. For an inquiry into the correlation between rate of learning of a particular material and some standard measure of intelligence, upon the influence of chronological age is as nearly as possible a constant, it is noted. (32) In general, the correlation between

and Jones, as well as Thorndike are but a few of the very able psychological workers who have exhaustively experimented in this field. (37) To study the findings of these experiments is neither feasible nor necessary here. A statement of the results will satisfy. There are at least five dimensions on which learning materials are distributed and influenced. Over a wide range of conditions, four of these are positively related to intelligence. (37) Special aptitudes such as mechanical, spatial, verbal, perceptual speed and kinesthetic sensitivity are a part of the general intelligence picture and may make wide variances in the rate of learning concomitant with the type of material to be learned. (46)

In summation, then, there are differences in rate of learning which are ascribable to differences in sex, chronological age, and test intelligence. However, individual differences do not end with these factors. Most learning requires calmness of mind and body. All emotions and feelings such as fear, anger, resentment, embarrassment, disappointment, worry, and illness must be regarded as stumbling blocks to a receptive frame of mind. (8) Individuals differ also in personality traits, race, facility for learning through eye or ear, attitudes and interests (37)

The educational level of the learner, which in all probability will have a direct connection with his previous knowledge and perhaps his skill possessed in relation to

and Jones, as well as themselves are not a few of the very  
 this psychological process who have extensively experienced  
 in this field. (25) To study the findings of these experi-  
 ments is neither feasible nor necessary now. A statement  
 of the results will suffice. There are at least five dis-  
 tinct or which learning materials are distributed and in-  
 fluenced. With a wide range of conditions, four of these  
 are positively related to intelligence. (26) Special appli-  
 cations such as mechanical, spatial, verbal, perceptual speed  
 and abstract reasoning are a part of the general intel-  
 ligence picture and may have wide variations in the rate of  
 learning consistent with the type of material to be

learned. (27)

In summary, then, there are differences in rate of  
 learning which are due to differences in the nature, quan-  
 tity and type of learning material. However, individual  
 differences do not end with learning. Most learning  
 involves activities of mind and body. All emotions and feel-  
 ings such as fear, anger, excitement, depression, sleep-  
 ing, and illness must be regarded as interfering  
 factors in a receptive frame of mind. (28) Learning is also  
 affected in personality traits, such as facility for learning  
 through eye or ear, attention and interest (29)  
 The educational level of the learner, which in all prob-  
 ability will have a direct connection with his previous  
 knowledge and experience will be a factor in relation to



specific material to be learned, has no little effect upon his rate of learning. Lastly, his past experience with various teaching techniques will have its influence in final results of the learning rate. (46)

Variability in the learning rate may also be attributable to unknown condition, such as those produced by diet or loss of sleep, or drugs. (37) Although the experimental evidence on the influence of many of these conditions does not yet permit confident generalization, the factors are all to some extent correlated with rate of learning. (37)

In conclusion, it can be seen that once the motion picture producer and his technicians have acquired a fundamental understanding of the pertinent psychological learning principles, they are placed in a position which permits them to apply the existing statements of learning theories, principles, and facts to the dynamic medium of the sound motion picture. In this respect it should once again be recognized that learning theories are not formulated on a basis of experiments in which the tasks and procedures are the same as those involved in learning from complex sound motion pictures. Therefore, it becomes necessary for the producer to ascertain exactly the degree to which known perceptual and learning principles apply to this special medium of instruction and communication. When this has been determined, relative correction becomes feasible through a reformulation of these principles, which in turn will form the keystone in the estab-

specific behavior is as learned, but no little stress upon  
 his part of learning. Lastly, his own experience with  
 various feeding responses with time is indicated in that  
 section of the learning table, 144.  
 Feeding is the learning part and also an experience  
 also to answer condition, such as those produced by the  
 idea of sleep, or drugs. (171) Although the experimental cri-  
 terion on the influence of many of these conditions does not  
 yet point out the generalization, the factors are all in  
 some extent correlated with part of learning. (171)  
 In conclusion, it can be seen that the whole sys-  
 tem of behavior and the behavioral data are a fundamental  
 understanding of the pertinent psychological learning cri-  
 teria, they are placed in a position which permits them to ap-  
 ply the learning processes of learning, behavior, behavior,  
 and facts in the system of the whole system system.  
 In this respect it should be noted that the system is  
 not divided into two separate as a whole of experience in  
 which the facts and processes are the same as those in-  
 volved in learning from complex and simple patterns. There-  
 fore, it becomes necessary for the student to understand  
 exactly the degree to which known concepts and learning  
 processes apply to this special system of behavior and  
 communication. And this has been discussed, relative to  
 reaction between systems through a system of behavior of these  
 behaviors, which in turn will have the system to the sys-

lishment of new learning principles applicable to the complex media of communication: Films, radio, and television. (6) A consideration of such a program will be expounded with greater detail in following chapters.



Information on new learning techniques available in the computer  
field at various times, which has been available for a  
period of time in various forms.

## CHAPTER IV

### SOME RELATIVE ASPECTS FOR LEARNING FROM FILMS

Two facts are offered as complications strongly influencing the use of the motion picture as an instructional medium. On the one hand, there is the fact that motion pictures are not simply pictures that move on a screen, and on the other hand, there is further implication in the fact that instruction as practiced is not necessarily the best situation for learning. These two fundamental facts give rise to many problems related to the production and employment of films for instruction; and the problems of research in the instructional use of motion pictures are, thereby, made particularly difficult. (22)

With the intent of developing perspective and insight in the instructional role of the motion picture, this chapter of the study has attempted to identify some of the symbolic levels and forms used in the motion picture medium. It is believed that if the symbolic forms used in motion pictures are understood, and if the dynamics of learning are applied to the use of these forms, the instructional efficacy of motion pictures should be improved and the results of this improvement be demonstrable. (22)

#### I. VISUAL AND AUDITORY RELATIONSHIPS

A question often asked of the psychologist, and as frequently left unanswered, concerns the problem of deciding

## CHAPTER IV

### THE RELATIONSHIP BETWEEN THE PHYSICAL AND THE PSYCHICAL

The first part of this chapter is devoted to a consideration of the physical and the psychical as two distinct but related aspects of the human organism. It is shown that the physical and the psychical are not two separate entities, but are two aspects of the same reality. The physical is the material basis of the psychical, and the psychical is the functional aspect of the physical. The two are inseparable, and their relationship is one of mutual dependence. The physical is not merely a passive substrate, but is actively involved in the psychical process. The psychical is not merely a subjective experience, but is an objective process which can be studied scientifically. The two are united in a single, unified whole, and their relationship is one of organic unity.

(1911)

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whether it is better to offer information to a man by eye or by ear. This problem is not a new one. Actually, it has received a great deal of attention in many fields, especially in the area of education, since the invention of the motion picture. In essence though, and in view of the research consumed, the best thing that can be said at this time is that there appears to be no general answer. (14)

Most experienced researchers will agree that the eyes and the ears are superior to any of man's other sense organs for communicative purposes. But of these two, each has its special characteristics, and it requires a careful and detailed statement of the particular problem to produce a clear distinction. Even so, a practical test of the two alternatives may be the fairest recommendation that can be made. As a guide in conducting such an analysis, a few generalizations should receive a basic consideration.

Essentially, one of the most important distinctions between vision and hearing is their organization, vision being organized with respect to space and hearing with respect to time. Naturally, there are temporal properties of things seen, and spatial localization of sounds heard, but these are secondary. Hand-in-hand with the difference between space and time, goes a difference in what fills them in. Fundamentally, the eyes see objects in space; the ears hear events that happen. With his eyes, man is able to orient himself in relation to his fellow men. His ears furnish him

without it is better to offer information by a man of age or  
 by sex. This would be not a new one, usually, it is  
 treated a great deal of attention in many kinds, especially  
 in the case of women, since the interest of the  
 world is more in women's minds, and in view of the  
 general knowledge, the best thing you can do will be  
 this time is not to say anything to be in general interest. (18)  
 That of course, however, will agree that the age  
 and sex are equally as important as the other things  
 for communication purposes, and of course, each has its  
 special characteristics, and it requires a careful and de-  
 tailed analysis of the particular problem in view of a clear  
 distinction, even so, a detailed look at the two sides.  
 First we see the latest recommendations that can be made,  
 as a guide in providing such an analysis, a few guidelines  
 from which to take a fairly comprehensive, and in some  
 cases, even at the most important distinction be-  
 tween vision and hearing is still important, which being  
 suggested only to be used for good and hearing also helps to  
 find, especially, that are important properties of hearing  
 time, and spatial localization of sound waves, but these  
 are secondary. Next in line with the difference between  
 space and time, there is a difference in what is seen in  
 phenomena, the eyes see objects in space, the ears hear  
 events that happen, this is the eye, and it is the eye  
 itself in relation to the other one. The way hearing can



with a sense of continuity and tell him when things start and stop. These individual sensory differences are basic, yet the two senses fit together with neither being sufficient without the other for normal activities. (14)

Superimposed on the inherent differences between the sense of sight and the sense of hearing, are the ways in which man is taught to use them. Through the eyes, it is possible for him to build up knowledge about many complex geometrical properties of the world. With them, he is directly able to make quantitative judgments of high accuracy. He is likewise permitted to judge the properties of objects abstracted from the accidental circumstances of their location, such as in orientation or in illumination. These complex perceptual skills often make a man's eyes more useful than elaborate instruments. In direct contrast, it is readily apparent that the ears are the most often rendered advantageous in direct, face-to-face communication. Coupled with man's ability to speak, his ears provide him with a spoken language. Written language follows as a later and slowly learned substitute for speech. (14) (41) (28)

Therefore, it can be seen that the eye finds its usefulness in judging spatial properties, or information that can be displayed in spatial terms. In addition, the eyes have the advantage that they can search through information and single out wanted items, and, from a practical point of view, it is much easier to store visual information. By the same



with a sense of acuity and will his own sense  
and sense. These individual sensory differences are made,  
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objects characterized from the geometrical characteristics of  
their position, such as in extension or in illumination.  
These complex geometrical relationships of a man's eyes are  
used in many different ways. In direct observation, it is  
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almost entirely subordinate for speech. (15) (16)

Therefore, it can be seen that the eyes are useful-  
ness in judging spatial properties, or information that can  
be displayed in spatial form. In addition, the eyes have  
the advantage that they can receive direct information and  
transmit out visual form, and, from a geometrical point of view,  
it is even easier to receive visual information. Of the same

process, though, the eyes are placed at a disadvantage in picking up and reading sudden signals. (14)

Although there appears to be no general answer that will establish either the eye or the ear as the better receptor for a learning stimulus, it is quite obvious that there is nothing complex about the manner in which people gain understanding of each other, of animals, or things in general. In many instances, these representations are experienced first hand. They are seen, felt, heard, smelled, or tasted. Thusly, people are sure what water is, they know the characteristics of a skunk, and are familiar with the qualities of a rose. Unfortunately many things are not met first hand, hence, some method for introducing understanding through a relative or vicarious experience is indicated. A highly qualified substitution for the real experience may be competently supplied by pictures. Even though an experience may have been real at one time, a picture can act as a reminder, or indicate steps to further study. Pictures have the facility for sharpening memories regarding real experiences and places, or phenomena which have been previously studied. Pictures, then, may recreate or reconstruct a past experience. The employment of pictures as a substitute experience is only possible, however, if the individual possesses enough related experience to understand the portent of the picture. In other words, whenever the individual is





acquiring a new experience, he is in need of some of his former experiences to tie in with the latest acquisition in order that he may more adequately understand it. Furthermore, such experiences tend to assist in the interpretation of pictures. The interpretation of a picture constitutes a chief interest among proponents of visual education. Proper interpretation of a picture requires the learner to infer certain aspects that may not be visually present. These inferences, or filling in, are supplied by the individual's past experiences. Specifically then, the learner must be capable of putting meaning into the picture if he is to derive meaning from the picture. (10) (11)

As has been pointed out, in order for him to keep abreast of current world events and, thereby, make his way in the world, modern man normally employs indirect observation for learning as a substitute for either first-hand doing, or first-hand viewing. He is fortunate in being provided with such a useful and realistic means of indirect observation as is inherent in the sound motion picture. (9)

## II. THE VALUES OF THE MOTION PICTURE

In view of their potentialities in modern education, it would be well to consider some of the specific values supplied by instructional motion pictures. Generally, instructional films are produced with particular educational goals in mind, namely: To help promote a skill or an attitude, to



convey certain facts, to help the viewer solve a complex problem. The skills may vary from those applied in delicate surgery to a common mechanical technique. The attitude may be portrayed at the international governmental level or within the home. The facts or information can range from simple explanations of nature to complex illustrations of the solar system. It is the motion picture, then, that makes possible the presentation of certain meanings involving motion that would otherwise be impracticable. It is this very characteristic of motion which enables the motion picture to compel attention. In a darkened room with brilliant white light coming from the screen, precluding distraction from anything else in the room, the student is provided with an intense experience, sometimes of high emotional quality. (9)

There are many phenomena in every day living that cannot be detected by the human eye because the process is either too slow or too rapid to permit study. The motion picture has a value in being able to help humans understand the time factor in any operation or series of events. With the versatility of the motion picture camera, the growth of a plant can be speeded up, or the passage of a bullet through a resisting force can be slowed, making possible a detailed observation of the factors involved. In similar vein, the motion picture can reduce or enlarge the actual size of objects, making it comparatively simple to study microscopic organisms, or conversely, the relationship of huge man-made





objects to their surroundings as provided by aerial views. Furthermore, by means of animated drawings and cut-away views, the motion picture presents an opportunity to study a process or procedure that would be otherwise impossible to see with the human eye. (7)

The modern news-reel film illustrates the motion picture's importance in providing an easily reproduced record of an event. Occurrences of international and national significance can be recorded for posterity, or a simple but essential teaching demonstration can be filmed for repeated and widely reviewed showings. On the other hand, in some of the very excellent documentary and historical films produced today, are revealed the motion picture's inherent abilities to bring the past and the distant into the classroom with a dramatic impact not otherwise possible. Simultaneously, the motion picture creates a common denominator of experience, making it practical for the fast and slow learners to enjoy common group experiences. Moreover, there is offered a satisfying aesthetic experience to the viewers through the motion picture's ability to stir and excite the imagination and at the same time present meaningfulness to the relationship of things, ideas, and events. In doing so, it relates ideas to supply meaning where apparently no meaning existed. In addition, it makes possible a compressing of time to give a sense to the flow of events which may not be easily had through the lengthy process of reading. (8)

objects in their surroundings as provided by optical traces.  
Furthermore, by means of estimated drawings and cut-aways  
views, the mental picture becomes an opportunity to study  
a process in perspective that would be otherwise impossible  
to see with the naked eye. (7)

The student nevertheless finds illustrated the mental picture  
that's important in providing an easily reproducible record  
of an event. Awareness of international and national sign-  
fication can be perceived for possibility, or a single cut-  
away section describing description can be taken for reference  
and easily revised drawings. On the other hand, in some of  
the very essential documentary and historical value provided  
today, we recognize the mental picture's inherent ability  
to bring the past and the present into the classroom with a  
dynamic impact not otherwise possible. Consequently, the  
mental picture provides a means of education of experience,  
making it possible for the last and new features to enjoy  
known from experience. However, there is always a nat-  
ural tendency towards experience in the physical world and  
action picture's ability to stir and excite the imagination  
and at the same time, present responsibility to the relation-  
ship of subject, object, and event. In doing so, it helps  
lead to a truly meaningful study of history or science related.  
In addition, it makes possible a comparison of time to time  
a view in the time of events which may not be easily had  
through the lengthy process of research. (8)



### III. THE SYMBOLIC NATURE OF FILMS

When the art of the motion picture is viewed with a broad and intelligent perspective, it becomes relatively easy to accept motion pictures as something more than simple photographs projected on a screen to entertain an audience through an impression of motion. Good visual materials, particularly motion pictures, possess an inherent ability to create moods. A child may look at a bird tending its young in a nest and be helped to think of God by remembering, "God --- careth for you" (I Peter 5:57) just as he does for birds. In such a manner, a mood of worship can be created. Similarly, a film may be shown depicting hungry children in Europe, resulting in a broadening of audience horizons and simultaneously developing a mood of charity and a desire to give. In a broad sense, then, cinematic films are pictures accompanied by interpretive language and reinforcing music. This perspective holds true for almost all entertainment motion pictures and there are indications that some instructional motion pictures are effected in a like fashion (22) (50)

Photography as the dominant symbol. Of the three symbolic forms contained in motion pictures, photography, music, and language, Hoban (29) has given photographic symbolism the theoretically dominant position in a motion picture. He considers photographs as symbols that present elementary abstractions much in a way that ordinary sense experience is

## III. THE PHYSICAL BASIS OF FILM

When the art of the motion picture is viewed with a

view and intelligent perspective, it becomes increasingly

easy to understand the physical basis of the motion picture

photograph produced on a screen in accordance with the

principles of the physical basis of the motion picture.

Physically motion picture, however, is somewhat different in

many ways. A film may look at a first glance like a piece

of a tape and is indeed so, but it is not a tape. It is

— a series of frames (or film) that are in fact the basis

of the motion picture, a series of frames that are

film, a film may be shown, showing motion picture in

fact, resulting in a continuous or continuous picture and

ultimately resulting in a good or bad picture and a picture is

film. In a broad sense, then, physical film and picture

are distinguished by the physical basis of the picture and

the physical basis of the picture is the physical basis

of the picture and there are differences between the physical

basis of the picture and the physical basis of the picture (to

be distinguished by the physical basis of the picture).

Physically, the physical basis of the picture is the physical

basis of the picture and there are differences between the physical

basis of the picture and the physical basis of the picture.

The physical basis of the picture is the physical basis of the

picture and there are differences between the physical basis of the

picture and the physical basis of the picture.



understood. Photographs are symbols created to symbolize a meaning which has already been "seen" by the photographer or the director.

To reemphasize, then, it can be said that the power of the photograph lies in the fact that it presents symbols in the same terms as normal sense perception. A photograph looks like the object photographed. It is an abstraction of visual form. The camera, when prepared for filming, embodies the viewpoint from which the future spectator will apprehend the appearance on the screen. This viewpoint may be various. Each object can be seen, and, therefore, filmed from a thousand different points, and the selection of any given point cannot, and should not, be by chance. This selection is always related to the entire content of the task that the director keeps in mind in aiming, one way or another, to affect the spectator. (40)

While the same physical device of the motion picture camera is used to photograph graphs and animations, and the same projector and screen to present them to an audience, graphs and animations are entirely different symbolic forms than are photographs. Specifically, graphs and animations, except the most elementary animations that actually reproduce visual form, do not symbolize situations as they are ordinarily perceived. They are line symbols representing the relationship between two abstract variables. Many instructional film producers seem to assume, erroneously, that the presen-



understanded. Furthermore, the question arises as to whether the meaning of the word "know" is already known by the person who is asked the question.

It is also true that the power of the imagination is not limited to the realm of the possible. It can also create worlds that are entirely new and different from anything that has ever existed before. This is the power of the imagination to create the impossible. It is this power that has led to the development of science fiction, fantasy, and other genres that explore the boundaries of the possible and the impossible. The imagination is a powerful force that can create worlds that are as real as our own. It is this power that has led to the development of the most powerful and enduring works of art and literature. The imagination is a gift that we all have, and it is up to us to use it to create the worlds we want to live in.

While the same physical basis of the motion picture camera is used in cinematography, graphic and animation, and the same projection and camera to project them in an audience, graphic and animation are entirely different technical forms. While the cinematographer, filmmaker, graphic and animation director are most elementary animators that actually reproduce actual events, the graphic animator is not so much an artist as a technician, he is a specialist in the use of the camera to produce a picture that is not a picture of a real thing, but a picture of a thing that is not real. The graphic animator is a technician, not an artist, and his work is a technical one, not an artistic one. The graphic animator is a technician, not an artist, and his work is a technical one, not an artistic one.

tation of graphs on a screen miraculously endows the graphs with the same communicative qualities possessed by photographs. (22) These same producers apparently fail to realize that, in light of the fact that films are fundamental to the drawing of inferences in a very large number of cases, the range and limits of the potency of motion pictures should be of major significance to educators and instructional film producers alike. To a certain degree, it is unfortunate that audiences tend to accept as authentic much of what they see in the movies, unless it is flagrantly incorrect. (7)

However, regardless of his moral obligations to his audience, the instructional film producer should be cognizant of the fact that an audience cannot comprehend a graph depicted on a screen unless the audience can already read graphs, and unless that audience has an extensive knowledge of the relationships presented graphically. Students must be taught to read the charts and graphs, giving these graphs motion on a screen can hardly teach them to read the graphs, anymore than it can make the relationships any clearer if the students have not previously learned to read them. (22)

Closely related to animated graph techniques, is the problem of using animated cartoons for instruction. Once again, a departure from the symbolic function of the photograph can be noted. Whereas, there is generally very little popularity professed by audiences for animated graphs, the animated

relation of graphs to a serious educational study, the graphs  
 with the same communicative function as those  
 given. (2) These same graphs apparently fail to  
 present what is likely to be the most important  
 in the study of mathematics in a very large number of cases,  
 the way and time of the history of mathematics  
 should be of major importance in education and research.  
 should the present state of affairs. In a certain degree, it is  
 unfortunate that mathematics have to be so widely known  
 of what they are in the history, unless it is the history of  
 math. (3)

However, regardless of the above criticisms in his  
 subject, the historical and present state of mathematics  
 of the fact that an excellent account is given of  
 placed on a recent volume of mathematics and physics, and  
 physics, and what that history has an extensive knowledge of  
 the relationship between mathematics and physics. It is not  
 likely to read the history and physics, giving more graphs  
 called as a series of nearly equal terms to read the graphs.  
 anyone that it is not the relationship and history of the  
 students have not previously learned to read them. (4)

Clearly related to the present graph technology, is the pro-  
 cess of using mathematical symbols for investigation, and again,  
 a reference to the specific features of the technology can  
 be made. What is known is known, very little is known  
 of the history of mathematics for the history of the history.



cartoon, by sheer attractiveness and simplicity of understanding, enjoys an unprecedented audience acceptance. Nonetheless, the lasting effectiveness of comic cartoons as a teaching device in motion pictures is open to serious question. The popularity of comic cartoons as entertainment does not assure that the "moral" of the cartoon will noticeably effect the behavior of the audience, in reality, it is the cartoon's lack of seriousness which tends to make it less worthwhile when viewed in retrospect by the audience.

It is doubtful whether many people have been converted to inter-cultural tolerance, or even to a disposition toward racial tolerance by the cartoon film, What's in Your Mind, or that many service men were deterred from picking up a booby trap by the Army's film, Booby Trap. On the other hand, such cartoons may have some therapeutic value. Conceivably, there can be a release of some deep conflict or some sense of guilt in watching the cartoon's exaggerated human weakness and human foolishness. Possibly it is soothing to the human ego to be assured by a cartoon that there are others who are suffering more in what might be considered a sorry world.

Undeniably, cartoons are vividly appealing, as observations of young children's responses have revealed. But, the cartoons do not need to have much meaning to the children to be enjoyed, the comic antics of the characters and the color movement are sufficiently appealing to maintain attention.

cartoon, of which circumstances and significance of importance-  
 ing, which are undoubtedly evidence everywhere. However-  
 ing, the lasting effectiveness of such cartoons as a basis-  
 ing dated in action picture is open to serious question.  
 The popularity of such cartoons as cartoons does not  
 assure that the "comic" as the cartoon will necessarily el-  
 lect the reaction of the audience, in reality, it is the  
 cartoonist's lack of awareness which leads to such a result  
 sometimes when viewed in retrospect by the audience.  
 It is doubtful whether many people have been converted  
 in their political opinions, or even to a disposition toward  
 racial violence by the cartoonists, which is the case.  
 on that many artists who are devoted from painting of a  
 group type of the type of the comic strip. On the other  
 hand, when cartoonists say that some political views, com-  
 munity, there can be a release of some deep conflict of  
 some sense of guilt in watching the cartoonist's expression  
 human weakness and human foolishness. However it is argu-  
 ing to the point that to be devoted to a cartoon that makes  
 the artist who is suffering with the artist to reveal  
 such a story within.  
 Occasionally, however the artist's expression, as a person-  
 lines of young children's responses have revealed. But, the  
 cartoonist is not sure to have such a result to the cartoonist  
 be enjoyed, the comic artist of the cartoonist and the artist  
 movement are undoubtedly appearing in various sections.



In education, however, it is the meaning, not simply the entertainment, that is important. There is no intent to deprecate the value of emotional experiences --- releasing, pleasant, and satisfying --- in education, but to emphasize that these experiences are not necessarily related to the objectives of education only because they are enjoyable.

It is the universal popularity of the cartoon with young and old alike that gives rise to the question of its adaptation on a wide scale to educational purposes. This in turn raises the question; Is the combination of photography and serious cartoons more effective than the animation alone? Again, how much of the cartoon's popular "antics" can and should be added to develop a warm interest in an educational film without detracting from the "moral" or the "lesson" to be taught? It is the vividness and forcefulness of material presented on the screen that registers with the audience. The cartoon, particularly the color cartoon, is a vivid method of presentation.

It is not the purpose of this study to attempt outright solutions to problems such as these, rather, they must be left to research in order to more effectively determine the instructional value of cartoons, their therapeutic values, and the relationship between such therapeutic values and instruction. Leastwise, there can be no question that cartoons involve a different symbolic form from photographs; that their moral lessons are more or less allegorical; that





they dramatically exaggerate whatever they show; and that they do this in such an extreme way that they can be viewed without the logical restraints which ordinarily are imposed on audience credulity. (21) (22)

Music symbolism. Music as a symbolic form articulates meanings frequently difficult to express in language or in photographs. It symbolizes moods and feelings, emotions and tensions. The fact that people may "know" but cannot always name the moods, emotions, or tensions conveyed by the music is, in itself, evidence of the symbolic character of music, and of its ability to communicate meanings which are non-verbal. (22)

It is commonplace that a motion picture, whether it has been produced for entertainment, information, or instruction, contain some kind of music. Music is included in films partly because of the tradition of accompanying silent pictures with a musical background played by piano, organ, or orchestra; and the practice has persisted. One of the problems which has been defined for investigation is that of the use of music in films which are designed for training men, for communicating ideas and concepts, for changing viewpoints and attitudes, and in brief, for learning. Theoretically, it is possible that the right kind of music, employed in the proper manner so as to be appropriate to both the subject matter and the audience, may facilitate learning. (54)

They have been very successful in their work and have  
 been able to do a great deal of work in the field of  
 research and development. They have been able to do a great  
 deal of work in the field of research and development.

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 deal of work in the field of research and development.

It is important to note that a great deal of work has  
 been done in the field of research and development. They  
 have been able to do a great deal of work in the field of  
 research and development. They have been able to do a great  
 deal of work in the field of research and development.



The functions of music in the entertainment film may be taken simply as what the director conceives them to be, and what the audience perceives them to be. The varied views of composers, musicians, and critics as to what the function of entertainment film music are can remain opinions without any necessity for testing their principle and application. For the instructional and informational film however, it is believed that any added music must function either directly or indirectly to aid learning. The satisfaction of such a function may be achieved through the acquisition of conceptual frameworks which enable a learner to structure material so that he retains it longer. (54 (3))

It is an historical fact that instructional sound film developed as a "talking film", and not just as a sound film. This line of development has been preserved relatively unchanged until recent years. There is concurrently a strong and widely expressed feeling among some authorities that music has no place in instructional films. There is even some apparent opposition to beginning and ending music in films, despite the sheer utility of introductory music to the projectionist in setting the sound level of his amplifier. Without such a device, the narration commences either as a whisper or as a thundering shout. (22)

This blanket objection to music in instructional films is made in believed opposition or ignorance of the legitimate function of the film in communicating feeling and emotion---



a function recognized very early in connection with feature entertainment films; or it is made in ignorance or disregard of the role of feelings, emotions, and attitudes in reinforcing learning. (22)

Very likely this objection is based, at least in part, on the improper use of music in theatrical and instructional films. Entertainment film producers have an irrational dread of any silence on the screen. They are prone to use music simply to eliminate silence more often than to reinforce the meanings of the pictures. In non-theatrical films the musical score is frequently mixed with the narration and the dialogue. On the feeble sound reproduction facilities of the average 16 mm classroom projector, the music and the narration fight each other, or both may unite to oppose rather than reinforce the pictures. (22)

Despite numerous statements in all types of literature ascribing important properties to film music, there is little valid information on the actual effects of the music, and no reports of experimentally determined results concerning the roles played by music in schoolroom motion pictures. The difficulty of establishing what are the "right and appropriate" musical effects is very great, because of this scantiness of scientific information on motion picture music. The material which does bear on motion picture music has been contributed to a few musical and motion picture journals by musicians, critics, and music educators. Unfortunately,





there are almost as many viewpoints as writers, and a task of classifying the statements, opinions, and hypotheses would be an arduous one. The need for research work in seeking principles which govern the operation of music to reinforce learning, and the need to state such relationships as may be found quantitatively so that film producers will have authentic guides for including particular amounts and kinds of music in instructional films, is particularly acute due to the lack of concrete knowledge in this area. In substance, therefore, if music does make any contribution to learning (and this is an hypothesis to be tested), the problem, then, becomes one of further research with an attempt to establish what is right and appropriate in terms of the effects of the musical accompaniment on people. (54)

The symbolism of language. Language is a symbolic vehicle of thought and reason. It is an instrument of naming and conceiving objects, and of combining and manipulating concepts and propositions. Language symbols are conceptual and digressive. They are used to express and communicate the results of the higher intellectual processes. Language is also a vehicle by which these processes are carried on. (22) Nonetheless, the role which sound plays in motion pictures is much more significant than a slavish imitation of naturalism within the medium. A principle function of sound should be to augment the potential expressiveness of the film's





content. (40)

If sound is compared to the silent film, it becomes possible to explain the film content more deeply to the spectators with relatively the same expenditure of time. It is clear that this deeper insight into the content of the film cannot be given to the spectator simply by adding an accompaniment of naturalistic sound. Something more must be done. This something more is the development of the image and the sound strip, each along a separate rhythmic course. They should not be tied to one another by naturalistic imitation but connected as the result of the interplay of action. Unity of sound and image is realized by an interplay of meanings which result in a more exact rendering of nature than its superficial copying. In silent film, by the editing of a variety of images, it is possible to attain the unity and freedom that is realized in nature only in its abstractions by the human mind. In sound film it becomes feasible, within the same strip of celluloid, not only to edit different points in space, but also to cut into association with the image, selected sounds that reveal and heighten the character of each. (40)

From Pudovkin (40) we receive primitive examples of the use of sound to reveal an inner content:

This can be cited in the expression of the stranding of a town-bred man in the midst of the desert. In silent film it would be necessary to cut in a shot of the





town; in sound film the town-associated sounds can be carried into the desert and edited there in place of the natural desert sounds. It is not generally recognized that the principal elements in sound film are the asynchronous and not the synchronous; moreover, that the synchronous use is, in actual fact, only exceptionally correspondent to natural perception. This is not, as may first appear, a theoretical figment, but a conclusion from observation.

For example, in actual life you, the reader, may suddenly hear a cry for help; you see only the window; you look out and at first see nothing but the moving traffic. But, you do not hear the sound natural to these cars and buses; instead you hear still only the cry that first startled you. At last you find with your eyes the point from which the sound came; there is a crowd, and someone is lifting an injured man, who is now quiet. But, now watching the man, you become aware of the din of traffic passing, and in the midst of its noise there gradually grows the piercing signal of the ambulance. At this your attention is caught by the clothes of the injured man: His suit is like that of your brother, who, you now recall, was due to visit you at two o'clock. In the tremendous tension that follows, the anxiety and uncertainty whether this possibly dying man may not indeed be your brother himself, all sound ceases and there exists for your perceptions total silence. Can it be two o'clock? You look at the clock and at the same time you hear its ticking. This is the first synchronized movement of an image and its caused sound since first you heard the cry.

Pudovkin (40) concludes by showing that there exists two rhythms, the rhythmic course of the objective world and the tempo and rhythm with which man observes this world. The world is a whole rhythm, while man receives only partial impressions of the world through his eyes and ears and to a lesser extent through his very skin. The tempo of his impressions varies with the rousing and calming of his emotions, while the rhythm of the objective world he perceives continues





in unchanged tempo. The course of man's perceptions is like editing a film, the arrangement of which can make corresponding variations in speed, with sound just as with image. It is possible, therefore, for sound films to be made correspondent to the objective world and man's perception of it together. The image may retain the tempo of the world, while the sound strip follows the changing rhythm of the course of man's perceptions, or vice versa. This is a simple and obvious form for counterpoint of sound and image.

Unfortunately, although Pudovkin presents strong arguments in favor of increased sound symbolism, there is a current tendency to interpret relationships on a higher conceptual level of abstraction in language than is supported by the photographic presentation. In addition, language in instructional films suffers from two other abuses, namely, the neglect to name things clearly and to name all the things the audience needs to have named; and the tendency to make too much use of language in narration or dialogue. (22)

Nevertheless, it must be recognized that language plays an important part in motion pictures, and that pictures without language are generally less effective than pictures with language. Language can conceptualize experience, and conceptualization is the highest process toward which instruction is directed. (22)

Hoban (22) has made it implicit that no matter what viewpoint is used to approach the problem of the relation of

in language. The laws of man's psychology is like  
 editing a film, the development of which can never stop-  
 pending, and the speed, with which it is being made,  
 it is possible, however, for some time to be made con-  
 siderable in the objective world and man's perception of it  
 possible. The laws may remain the same at the same  
 while the same step follows the changing system of the  
 course of man's psychology, or vice versa. This is a step  
 and another form for communication of man and things.  
 Unconsciously, although without conscious effort, ego-  
 centric in form of language, which is a very  
 great tendency to language relationships on a higher con-  
 ceptual level of abstraction in language than is reported  
 by the phonographic presentation. In addition, language is  
 instrumental like other tools and other means, namely,  
 the subject is not things directly and is not all the things  
 the subject needs to have himself and the tendency to make  
 too much use of language in narrative or dialogue. (10)

Nevertheless, it must be recognized that language plays  
 an important part in action, science, and the process with-  
 out language are knowledge and objective than science with  
 language. Language and consciousness, science, and con-  
 sideration is the highest process toward which language  
 like is directed. (11)

There (12) has been it indicates that no matter how clear  
 points it need to express the problem of the relation of



language to pictures, there remains the experimental evidence that language increases comprehension from pictures.

Studies in which films with and without titles, with and without commentary, and with and without prior introductory language experience have been compared, have consistently supported the proposition that language which is effectively integrated facilitates learning from films. However, another conjecture is offered by Hoban (22) as he cites that:

Some great motion picture directors have a genius for producing motion pictures in which the pictures tell the story, and language is held to a minimum. Robert Flaherty's unparalleled Nanook of the North uses a minimum of language. Flaherty is a master of the camera and uses it with unsurpassed narrative effect. Even in his more recent Louisiana Story, Flaherty employs language frugally, but effectively. John Ford is another director who tells his story with the camera and dialogue. It was because of Ford's mastery of camera and direction that Stage Coach and The Informer achieved greatness.

One can obtain a good idea of some of the skill developed in the use of language in films by comparing an instructional film produced this year with one produced ten or more years ago. In the older films, the narration was dense and rapid. It seems as if filmmakers, having found their voice, felt compelled to use it furiously. Many instructional films produced in the past were little more than illustrated lectures in which the lecture was highly condensed, and the picture more or less an interference. This use of pictures as the backdrop for language is slowly being overcome. How-



ever, perhaps the greatest fault of language use in instructional films is the tendency to intellectualize the pictures too quickly in language, rather than to leave intellectualization to the audience after granting a time for film content reflection and analysis. The film is so new as a medium of communication, and language is so old and has acquired such an unmerited instructional prestige, that instructional film-makers have yet to learn how to blend words and pictures, and how to use them most effectively, so as to increase the learning values of films. (22)

When it becomes evident that pictures, music, and words (sound) are all symbolic forms, and that people react to them as symbols, it becomes increasingly clear that the power of any medium of communication to provoke audience reactions is determined by the richness of the symbols, or perceptual and conceptual cues, employed in the medium. Other things being equal, the greater the number of these cues to meaning that are included, particularly the greater and variety and relatedness of the symbols used, the more effective the response of the audience to the medium.

It has been postulated that the power of the motion picture lies in the fact that it is "visual" and that it "portrays motion". In one respect, this is correct and in another it is not. If the sense of sight and the element of motion were the determining factors of the power of the motion



even, perhaps the greatest fault of language now is that  
 almost none is the necessary or indispensable the subject  
 too widely in language, which has to have (perhaps)  
 lesson in the subject after giving a class for the  
 last period and finally, the first is to have a  
 subject of conversation, and language is to be the  
 subject of the subject (perhaps) (perhaps), and  
 instruction and discussion must be to have the first  
 words and phrases, and one of the last must necessarily, as  
 as to have the subject of the first (1911)  
 that is to have the subject of the first, and words  
 (1911) and all subjects, and the first must be to have  
 as subjects, it is to have the subject of the first of  
 any subject of conversation, or subject of conversation  
 is to have the subject of the subject, or subject  
 and conversational that, subject in the subject, and words  
 being said, the subject of the subject of the subject  
 that are subjects, necessarily the subject and words and  
 relationship of the subject, and the subject of the  
 subject of the subject in the subject.  
 it will then be said that the subject of the subject is  
 the first in the first of the "first" and the first is "first"  
 the subject, in the subject, and the subject is to be  
 that is to be, in the subject of the subject and the subject of  
 subject and the subject of the subject of the subject

picture, it would be difficult to "explain" the power of the radio, or the power of the press, neither of which appeals to the sense of sight, as such, or summarily, "portrays motion". (22)

picture, is made so difficult to explain, the power of the  
 soul, or the power of the body, and the power of the  
 to the power of sight, as well, or essentially, "povoye"  
 "vision". (181)

and the power of the body, and the power of the  
 to the power of sight, as well, or essentially, "povoye"  
 "vision". (181)

and the power of the body, and the power of the  
 to the power of sight, as well, or essentially, "povoye"  
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 "vision". (181)

and the power of the body, and the power of the  
 to the power of sight, as well, or essentially, "povoye"  
 "vision". (181)



## CHAPTER V

### THE RELATIONSHIP OF PSYCHOLOGICAL LEARNING PRINCIPLES TO SOME OF THE DYNAMICS OF LEARNING FROM FILMS

Once the separate communication functions of the different symbolic forms present in the motion picture film are recognized and understood with respect to their achievements and integration, it then becomes practical to produce an intelligible, predictable pattern for learning from films. Subsequently, in view of the fact that a consideration of instructional films must ultimately lead to their primary purpose--- instruction, this all encompassing factor constitutes the topic for detailed investigation during the remainder of this study. (22)

It has been implied in previous chapters that instruction is the arrangement of the environment so as to stimulate efficient learning. In turn, it can be said, that instruction and learning are related as cause and effect. Essentially, then, it is reasonable to hypothesize that instructional films will instruct best when they are produced and used so as to conform to the dynamics of learning. (22)

#### I. MOTIVATION AND INCENTIVES-REALISM AND PRACTICABILITY

Learner representation in instructional films. There exists a large number of instructional objectives which involve the performance of some motor act in response to a stimulus,

THE INVESTIGATION OF THE INVESTMENT OF THE INVESTMENT  
TO THE INVESTMENT OF THE INVESTMENT

One of the major responsibilities of the investor-  
and especially those invested in the market place is the  
responsibility and investment with respect to their responsibilities  
and investment, in their business activities in relation to  
investments, particularly payments for interest and taxes.  
Consequently, in view of the fact that a responsibility of  
investors is to invest their money in the market place, it is  
necessary to invest in the market place all the money that is  
available to the investor for investment in the market place  
investments of the investor.

It has been pointed out in previous chapters that investors  
have a responsibility to the market place as an investor  
efficiency investor. In fact, it can be said, that investors  
and investors are invested in the market place. Consequently,  
investors are responsible to the market place. Investors are  
will invest their money in the market place and will not be  
invested in the market place.

1. INVESTMENT AND INVESTMENT-RELATED INVESTMENT

Investment responsibilities in investment

There is a large number of investment-related activities which involve  
the investment of money and are in relation to a business.

the teaching of which cannot be conveniently accomplished in the usual class room situation. It may be desired to teach a response to a stimulus which cannot be presented in the class room. In such a case, the motion picture affords a possibility of bringing into the class room an approximation of the desired stimulus. Other stimuli may be easily brought into the class room, but these may be too small for effective perception by all the members of a class. If the stimulus can be adequately presented by films, an economy of student-teacher time may be achieved through mass instruction. (43)

A substitution for some functions of a class room teacher can be assumed as a basic requirement of mass instruction. Conceivably, occasions may arise in which a scarcity of trained teachers will exist. Furthermore, circumstances may make it necessary to limit the number of devices (stimuli) to be used in training. Under these conditions, then, it may be possible to use specific categories of sound motion pictures in lieu of the devices and of the instructors. This in turn gives rise to questions on how best to construct and use films for achieving the desired instructional objectives. However, an exhaustive consideration of these questions is beyond the scope of this study and, consequently, the proposal presented will be limited to the development of a single hypothesis relative to perceptual-motor learning. (43)

Perceptual-motor act refers to the overt moving or man-



The standard of which cannot be consistently maintained in  
the world of human affairs, it may be desired to learn  
a person to a situation which cannot be mastered in the  
same way. In such a case, the person should attempt a  
possibility of finding the right time in approximation  
of the desired situation. This should not be easily  
produced into the mind, but there may be the right time  
attained by all the means of a plan. It has  
attention can be adequately presented by itself, as necessary  
of which person may be achieved through some in-  
struction. (2)

A situation for the purpose of a plan may be  
seen by means of a single requirement of such instruction.  
Consequently, sometimes may arise in which a person is  
trained persons will arise. Furthermore, sometimes may  
only it necessary to find the means of doing (2)  
to be used in training. When these conditions arise, it  
may be possible to use the same category of such action  
picture in line of the person and of the instruction.  
This is the first step to question on how best to construct  
and the first step in the first instructional object  
live. However, an extensive modification of such con-  
dition is beyond the scope of this study and, consequently,  
the proposed person will be limited to the development of  
a single hypothesis relative to personal-mean learning. (3)  
Therefore, the first step in the first instructional object

ipulation of some body part in response to a stimulus. Thus, the following of a moving object with the hand in a pursuit task or the placing of an object in a required position would be perceptual-motor acts. On the other hand, to re-examine a definition of learning, it can be said that learning implies the change in strength of a response to a stimulus in consequence of responding to the stimulus. The response strength may change for other reasons, and it might be helpful to examine these other variables in the context of instructional films, but the present concern is with learning as defined. (43)

Provided there is no desire to set up a response to the film itself, the film cannot be considered to present the actual stimulus to which a response is desired. Further, it is highly unlikely that the stimuli presented in the film will specifically evoke the desired response or responses. In order to accept this thought, it is necessary to make certain assumptions concerning what happens in film-mediated learning in order to account for the occurrence of any of the intended learning.

First, it is necessary to assume that there is some transfer from the film presented stimulus used in training; that is, that the learning of a response to one stimulus will have some effect on the response to other stimuli.

Second, it must be assumed that during the viewing of the film, the learner does in some way response to the film

position of some body part in response to a stimulus. Thus, the following of a visible object with the hand is a response back on the hand of an object in a perceived position would be generalization. In the other hand, to establish a definition of learning, it can be said that learning is a change in response to a stimulus. The stimulus is a response of responding to the stimulus. The response strength may change. The other means, but it might be helpful in examining these other variables in the context of psychological life, but the answer is simply learning as defined. (10)

Provided there is no desire to get up a response to the stimulus, the stimulus is considered to be a response to the stimulus. In which a response is desired, but not, it is highly unlikely that the stimulus is desired in the stimulus. All responding from the desired response or response. In order to respond to this stimulus, it is necessary to have certain assumptions concerning what response is the desired learning in order to assume the response of the stimulus. The intended learning.

First, it is necessary to know that there is some response from the stimulus. Second, it is necessary to know that there is some response from the stimulus. Third, it is necessary to know that there is some response from the stimulus. Fourth, it is necessary to know that there is some response from the stimulus. Fifth, it is necessary to know that there is some response from the stimulus. Sixth, it is necessary to know that there is some response from the stimulus. Seventh, it is necessary to know that there is some response from the stimulus. Eighth, it is necessary to know that there is some response from the stimulus. Ninth, it is necessary to know that there is some response from the stimulus. Tenth, it is necessary to know that there is some response from the stimulus.

Second, it may be assumed that during the period of the stimulus, the learning is not a response to the stimulus.



presented stimuli. He may actually perform the desired responses overtly; he may make the responses implicitly; or he may make the responses symbolically by verbalization or other self-signalling devices.

Third, if the actual desired response is not performed, it must be assumed that there is some transfer from the response which occurred in the training situation to other responses. (45)

The first assumption may be made more exact, though still qualitative, thus: During practice a response is set up not only to the stimulus used, but to a family of similar stimuli, the strength of the response to any particular stimulus being inversely proportional to the dissimilarity of the particular stimulus from the stimulus used in training. In order to make this postulate quantitative, it would necessary to state a function of dissimilarity. Nevertheless, certain conditions for film production may be deduced.

From this assumption, it may be derived that, for greatest efficiency of learning, the stimuli presented in the film should be as similar as possible to the stimuli which should occur in the actual performance (or test) of the desired learning. The film representation should approximate as nearly as practicable the details of the actual stimulus in terms of color, shading, perspective, sounds and content. (43)

In a perceptual-motor act, whether or not there is a distinct sequence, the stimulus and the occasioned act are

presented itself, it was usually better than most of the  
 other (which he was not the respondent himself) as to  
 say only the necessary thing by way of saying it  
 other self-sufficiently.

Then, it was said that the respondent is not present,  
 it was as though they were in some place from the  
 other which occurred in the training situation in other  
 instances. (45)

The first assumption was that the respondent, though still  
 qualitative, was being treated as a respondent in the up and  
 only as an absolute one, not as a family of other things,  
 the strength of the response to any particular situation being  
 directly proportional to the distinctness of the particular  
 relation from the relation seen in training. In order to  
 make this possible, qualitative, it would be necessary to make  
 a number of distinctions. Qualitative, qualitative  
 the first distinction was the answer.

From the assumption, it was derived that the first  
 was that of training, the second presented in the first  
 should be as clear as possible in the first which should  
 come in the second (perhaps for that of the first).

Training. The first assumption was that the respondent is not  
 it is possible to train in the second relation to some  
 of action, training, qualitative, qualitative and quantitative. (46)

In a formal sense, the answer is not that it is a  
 distinct response, the training and the respondent are the

constantly changing. The changes may be of two kinds: On the one hand, there may be continuous changes, as in the pursuit task, or a radically changed configuration of the object acted upon as in an assembly task. On the other hand, there may be changes in the disposition of the parts of the body of the performer (hands). Such changes become the stimuli for further action. Thus, if the film is to reproduce the actual stimulus of the test situation, it must show all these changes as exactly as possible. (43)

The major hypothesis then, is: The learning of a perceptual-motor act, through films, will be more effective as the film presentation approaches a representation of the learner himself performing the act desired. (43)(45)

The sound motion picture is a very suitable medium for investigating the contributions of degree of realism in the representation of training tasks. The possible range of experimental variations is wide and may include verbal symbols, schematic animation (signs), varying degrees of photographic realism as well as various degrees of authentic sound.

Roshal (45) has made an important exploratory study of some degrees and kinds of realism in sound film mediated learning of a perceptual-motor skill. The principal hypothesis of the experiment was the same as that already presented, in that the effectiveness of a training film designed to teach a skill is increased as the film approaches absolute realism in presenting the task or skill.



possibly identical. The choice may be of two kinds: the  
 one can be, there may be conditions under, as in the  
 present case, or a relatively changed composition of the  
 object which may be in an already fixed, or the other hand,  
 there may be change in the dimension of the field of the  
 body of the performer (hand), and change in the  
 relation to the object, thus, if the line is a repre-  
 sentation of the object of the task situation, it may now  
 all these changes as exactly as possible. (43)

The major hypothesis here, the learning of a group-  
 individual task, through time, will be more efficient as the  
 time progresses; however, a hypothesis of the learning  
 itself regarding the act desired. (44)

The same action picture is a very similar action for  
 individual and group situations of degree of freedom in the  
 presentation of the task. The results of the  
 individual situation in time and may include verbal symbols,  
 numerical symbols (signs), varying degrees of freedom  
 result as well as various degrees of freedom. (45)

Second (46) the same as (45) but with a different kind of  
 degree and kind of freedom in time. The results of the  
 task of a group-situation will. The individual hypothesis  
 of the situation and the time in time already presented, in  
 that the effectiveness of a learning task depends on time  
 a skill is learned as the time progresses. (47)

It concerns the task of skill.

To conduct this research eight experimental versions of a film were designed and produced to teach Navy recruits the tying of three knots of graduated difficulty: The bowline, the sheetbend, and the Spanish bowline. These versions differed with respect to four variables which were controlled so as to vary the degree of "realism" achieved in each film version. The variables employed were:

Camera angles. The tasks were photographed from the viewpoint of the learner facing the demonstrator (180 degree angle), and from the viewpoint of the learner as he would perform the task himself, by shooting over the shoulder of the demonstrator ( 0 degree angle). In six versions the 0 degree angle was used; in two versions the 180 degree angle was used.

Motion. Four experimental film versions showed the tying of the knots in normal realistic motion or action patterns, (motion versions), and the other four showed progressive steps in the knot-tying sequence, without including the motions (static versions).

Hands. Two of the static versions were produced to include the hands of the knot-tyer; the other two static versions show only the line in successive positions as it was tied. All the motion versions included the demonstrator's hands.

Participation. Four of the versions, each including a unique combination of the preceding variables, required the





learners to tie the knots simultaneously with the film demonstration. The other four versions, parallel to the first four with respect to the previous variables, did not require participation during the film showing.

As a result of the experiment the following most significant results were derived:

1. Learning from films. The films taught the recruits, with varying degrees of effectiveness, how to tie the knots. In the "no film" group only 7 per cent of the men could tie the bowline, 3 per cent the sheetbend, and none the Spanish bowline; much higher percentages of the experimental film groups succeeded in tying the knots.

2. Difficulty of the knots. The three knot-tying tasks were of varying difficulty. The over-all order was, from easiest to most difficult, the bowline, sheetbend, and Spanish bowline.

3. Camera angle. Large and consistent differences favoring the 0 degree camera angle (the subjective or performer's eye view) were found for all three knots.

4. Motion. The versions portraying the task in continuous motion were significantly more effective than the static versions.

5. Hands. Comparison of the static hands versions with the static no hands versions, favors the no hands versions. This unexpected result may be attributable to the fact that the inclusion of the hands obscured some of the line, and

- ...to the same extent as the other groups, and the results were similar.
- ...the results of the experiment, the following were obtained:
1. The results of the experiment, the following were obtained:
2. The results of the experiment, the following were obtained:
3. The results of the experiment, the following were obtained:
4. The results of the experiment, the following were obtained:
5. The results of the experiment, the following were obtained:
6. The results of the experiment, the following were obtained:
7. The results of the experiment, the following were obtained:
8. The results of the experiment, the following were obtained:
9. The results of the experiment, the following were obtained:
10. The results of the experiment, the following were obtained:

presented a more crowded perceptual field.

6. Participation. According to the main hypothesis, it was expected that participation of subjects by actually having a line in hand and tying a knot simultaneous with the sound film instruction on how to tie the knot, would improve learning. This was not found to be true. This outcome may be due to the fact that the participation as defined was not actually achieved. While all subjects attempted to "participate", a proportion never actually succeeded in tying knots. Tests showed that only a few more knots were tied during participation trials while the film set the pattern and instructions were given in the commentary, than were tied during the critical test period immediately following film instruction.

From this research of Koshal, (45) it is possible to derive some basic conclusions for film mediated learning, essentially: A film will be more effective in teaching a skill if the task is portrayed from the viewing angle of the learner as he will perform the act. The "subjective" or 0 degree camera angle is more effective than the "observer" or 180 degree camera angle. Directors might well improve the effectiveness of films designed to teach perceptual-motor tasks by taking this finding into account when filming demonstrations of such tasks. Furthermore, a presentation which shows the motions involved is more effective in achieving learning of perceptual-motor tasks involving continuous



[illegible]

movement, than a series of static photographs. However, in spite of the portent of these conclusions, further research is needed to determine how participation (in the sense of practice during film showings) can be achieved effectively in training films, and to discover what contribution different kinds and amounts of participation can make to learning.

## II. SELF ACTIVITY

Raising and answering questions in presentation. A number of widely accepted principles of learning stress the importance of increasing activity in learning. These principles emphasize specifically such activities as practice, participation, and problem solving; the contribution of such complementary features as repetition and knowledge of results is recognized in connection with all these principles of learning. (44)

In the past, instruction via the sound film has been characterized by a conspicuous lack of overt audience activity. The viewing situation has been essentially a passive one. The question then, arises as to the efficacy of increased activity in a film-learning situation. It would indicate the need for an experiment which should attempt to assess the relative contribution to learning from films of participation (by immediate audience response to inserted questions on salient facts), of reinforcement (by immediate repetition in titles

[illegible]

is emphasized in connection with all these principles of  
complementary therapy as revealed and revealed in various  
perspective, and various points; the combination of such  
also represents specifically some activities as possible  
patterns of therapeutic activity in learning. These include  
use of actively engaged principles of learning across the in-  
teraction and interaction across in interaction. A new  
learning (44)

It is not clear, however, whether the two views are based on different assumptions or whether they are based on the same assumptions. The question arises, again, as to the effect of the two views on the results of the investigation. It would indicate the need for an experiment which would determine in advance the value of the constant to be used in the calculation of the results. The question arises, again, as to the effect of the two views on the results of the investigation. It would indicate the need for an experiment which would determine in advance the value of the constant to be used in the calculation of the results.



of salient points of fact), and of showing a film twice. (44)

The purpose of such a research project should be to determine, through the medium of two types of films, the effectiveness of particular types of overt actions on learning. A method to be used would be that of interjecting a certain number of questions into the film so that the student would be forced to answer questions on what he has just seen. Since it could be quite possible that the film subject matter might influence the relative effectiveness of the questioning, the subject matter must be varied by showing two films, one of which might be technical (such as teaching the use or operation of some apparatus), while the other film might be of general informational value. (43)

Such a research investigation would be of theoretical importance, because it would help to check, in a practical situation, on the wide-spread psychological principles that participation and active responses promote learning. It would also be of practical importance, since the investigation would help to demonstrate whether or not a relatively simple modification of the usual procedures of producing and using instructional films will increase the efficiency in learning from sound films. (43)

In order to carry out the avowed purposes of such a project, films must be carefully designed to assure that they contain a large number of ideas so that they will lend themselves to questions and statements presented at a persistent



level. In addition to this, the films must contain enough natural breaks so that questions and statements can be inserted in the commentary.

Interested in the potentialities offered by just such a problem, that is, the effectiveness of particular types of overt actions on learning as presented through films, Kurtz, Walter, and Brenner (31) devised an experiment in which six methods of teaching a body of factual material by films were compared. Two different films were used: One dealt with a technical subject, The Care and Use of Hand Tools- Wrenches; the other was of the general information type dealing with "Snakes".

Six versions of each film were prepared as follows:

- I. The original film, used as a control version.
- II. A repetition version, consisting of two prints of the original film, spliced together, and shown in continuous succession.
- III. A "persistent questions" version that had multiple-choice questions inserted as frequently as possible, every 32 seconds on the average.
- IV. A "persistent statements" version which contained reinforcing statements at frequent intervals, on the average 32 seconds.
- V. A "medium questions" version which contained only every alternate question used in the persistent question version.



1. The first step is to identify the problem or goal. This involves understanding the current situation and what needs to be achieved.

interested in the possibilities of developing a  
 program, and as the effectiveness of developing a  
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 is based on the effectiveness of the program.

1. The original film, used as a general master.  
2. A duplicate master, consisting of two prints of the original film, which together, are used as a general master.

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THE JOURNAL OF THE  
ROYAL ANTHROPOLOGICAL INSTITUTE  
OF GREAT BRITAIN AND IRELAND  
VOLUME 100, PART 1, 1970

1. The first of these is the "National Commission on the Causes and Prevention of Violence" which was established in 1969. This commission was created by President Johnson and was headed by Chief Justice Warren. Its mandate was to study the causes of violence in the United States and to recommend ways to prevent it. The commission's report, "The Causes of Violence," was published in 1971. It identified several factors that contribute to violence, including poverty, social inequality, and the availability of firearms. It also recommended several measures to reduce violence, including improving the criminal justice system, providing social services, and controlling the sale of firearms.

VI. A "medium statements" version which contained only every alternate statement used in the persistent statements version.

The inserted multiple-choice questions were designed to be very simple, always covering information that had just been presented. They were intended to facilitate learning, not to measure the learning which took place. The students were required to answer each question as it appeared on the screen. After a short interval, the correct answer was given, and the film continued to the next point. The statements were intended to reinforce the information which immediately preceded them and were inserted at the same places in the films as were the questions in the "questions" version. They covered the same material.

A total population of 3039 tenth-grade students in seven Pennsylvania high schools participated in the experiment. Of this number, an analysis was made of the test scores of 1332 subjects, comprising 111 boys and 111 girls from each of six of the seven schools. The experimental sample was selected by matching individuals across the six schools for sex, age, and mental ability (as measured by the Otis Quick-Scoring Mental Ability Test). Since the samples in all the schools were practically identical with respect to age, sex, and intelligence test scores, the sample in each school was used as an intact group for one version of each of the two films. However, in no school was the same version of both films shown.





In executing the experiment the students were first given a list of the unfamiliar words which would be mentioned in the films. In the case of the inserted questions versions, they were given verbal instructions about answering the questions in the film on a special answer sheet. The film version was shown, and immediately afterwards, a multiple-choice item test was administered. The test on the "Wrenches" film contained seventy-one items; the test on the "Snakes" film included seventy-four. The tests were readministered after a period of four weeks as a means of measuring retention of learning.

The results of the experiment were not as indicative as had been originally assumed, although it was found that the repetition version and the inserted questions and statements versions were generally superior to the original film shown once. Showing the film twice (repetition version) was about as effective for teaching specific important points as emphasizing these points directly by the insertion of participation questions or reinforcing statements.

However, the results that were obtained can be somewhat defended due to the fact that the rank order of the six methods was generally inconsistent as between both sexes and both films. The results suggest that inter-school variability may have been almost as great as the inter-method variability despite the matching techniques used.

In the final analysis, Kurtz, Valtor, and Brenner (31),



were able to state that the absence of a generally consistent order of effectiveness of the various treatments of their experiment, limited the conclusions that could be drawn. It did seem clear, though, that both inserted questions and statements and repetition of the film without inserted material were effective in facilitating learning. Nevertheless, showing the film twice, a relatively simple and inexpensive procedure, seemed to be about as effective as the more elaborate methods used.

### III. SEEING AND ORGANIZING RELATIONSHIPS

Meaningfulness- Preliminary overview. The use of instructional films in class room situations has revealed that film introductions and summaries may vary in their effects from a point of interfering with the instructional effects of the main body of the film to a point of making significant contribution to achieving the instructional objectives. The general belief is that properly planned and produced introductions and summaries in films may make it unnecessary for instructors to give verbal introductions and summaries which are related to the defined instructional objectives of the films. Furthermore, there is a certain amount of evidence to suggest that an oral introduction to a film for the purpose of orienting and motivating the audience, results in more learning. This, however, raises the questions: (1) Is the introduction as provided within the usual instruc-





tional film equally valuable; if not (2) Can it be improved; and (3) What functions can it be expected to perform? These questions are especially important relative to instructional tasks which are to be accomplished by sound motion pictures exclusively. (6) (33)

A film introduction is defined as that portion of a film, excluding the main and credit titles, which begins the presentation, and runs up to the beginning of the body of the film. The possible functions of an introduction to a film may be classified under the following eleven headings:(33)

1. Stresses the importance of the material in the film.
2. Stresses the consequences if the material in the film is not learned.
3. Introduces the characters to appear in the film.
4. Poses the problem to be dealt with in the film.
5. Sets the stage, that is, orients the audience to the scene of action.
6. Points out important features which will be developed in the film and to which the audience should pay special attention.
7. Secures the attention of the audience by some dramatic device.
8. Shows the trainee the relevance of the material in the film to what he has learned previously.
9. Explains to the instructor the situation for which the film is intended.

elemental film usually follows (1) and (2) and is the important  
and (3) that the audience can be expected to understand. These  
questions are especially important relative to the audience  
which will see the movie and the audience which

consequently, (4) and (5)

The film introduced in the first section of the  
film, including the main and most important, which begins the  
presentation, and runs up to the beginning of the body of  
the film. The general function of an introduction is a

film may be classified under the following types (classification)

1. Discusses the importance of the subject in the film.

2. Discusses the importance of the subject in the

film is not limited.

3. Discusses the importance of the subject in the film.

4. Discusses the importance of the subject in the film.

5. Discusses the importance of the subject in the film.

6. Discusses the importance of the subject in the film.

7. Discusses the importance of the subject in the film.

8. Discusses the importance of the subject in the film.

9. Discusses the importance of the subject in the film.

10. Discusses the importance of the subject in the film.

11. Discusses the importance of the subject in the film.

12. Discusses the importance of the subject in the film.

13. Discusses the importance of the subject in the film.

14. Discusses the importance of the subject in the film.

15. Discusses the importance of the subject in the film.

16. Discusses the importance of the subject in the film.

17. Discusses the importance of the subject in the film.



10. Provides additional inspiration which might motivate the student or trainee to undertake further activities after seeing the film.
11. Shows the purpose of the film. (Probably one of the most important functions of an introduction is to tell the student exactly what the film is about.)

The filming technique which may be used to attain these objectives can similarly be classified: (33)

1. Live action. (Simple movement from real life.)
2. "Dramatic" live action. (Action used with dramatic effect.)
3. Use of models (scale representations).
4. Animation.
5. Flashes forward (short shots of scenes to follow are included in the introduction).
6. Titles to explain the film.
7. Remarks by an authority on the subject.
8. Narration by an off-stage commentator.
9. Demonstration of a task being performed.
10. Slow motion or speeded motion.
11. Diagrams, still shots, tables, graphs.
12. Audience participation (as in asking a question and allowing time for an answer).

Interested in this problem of comparing the effectiveness of instructional sound motion pictures by varied introductions employed in the film, Lathrop (47) (33) has conducted a study

10. involves additional investigation which might have been the subject of a separate section.
11. There are many of the film. (Probably one of the most important functions of an introduction is to tell the student exactly what the film is about.) The film technique which may be used in this case is suggested as follows: (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z) (aa) (ab) (ac) (ad) (ae) (af) (ag) (ah) (ai) (aj) (ak) (al) (am) (an) (ao) (ap) (aq) (ar) (as) (at) (au) (av) (aw) (ax) (ay) (az) (ba) (bb) (bc) (bd) (be) (bf) (bg) (bh) (bi) (bj) (bk) (bl) (bm) (bn) (bo) (bp) (bq) (br) (bs) (bt) (bu) (bv) (bw) (bx) (by) (bz) (ca) (cb) (cc) (cd) (ce) (cf) (cg) (ch) (ci) (cj) (ck) (cl) (cm) (cn) (co) (cp) (cq) (cr) (cs) (ct) (cu) (cv) (cw) (cx) (cy) (cz) (da) (db) (dc) (dd) (de) (df) (dg) (dh) (di) (dj) (dk) (dl) (dm) (dn) (do) (dp) (dq) (dr) (ds) (dt) (du) (dv) (dw) (dx) (dy) (dz) (ea) (eb) (ec) (ed) (ee) (ef) (eg) (eh) (ei) (ej) (ek) (el) (em) (en) (eo) (ep) (eq) (er) (es) (et) (eu) (ev) (ew) (ex) (ey) (ez) (fa) (fb) (fc) (fd) (fe) (ff) (fg) (fh) (fi) (fj) (fk) (fl) (fm) (fn) (fo) (fp) (fq) (fr) (fs) (ft) (fu) (fv) (fw) (fx) (fy) (fz) (ga) (gb) (gc) (gd) (ge) (gf) (gg) (gh) (gi) (gj) (gk) (gl) (gm) (gn) (go) (gp) (gq) (gr) (gs) (gt) (gu) (gv) (gw) (gx) (gy) (gz) (ha) (hb) (hc) (hd) (he) (hf) (hg) (hh) (hi) (hj) (hk) (hl) (hm) (hn) (ho) (hp) (hq) (hr) (hs) (ht) (hu) (hv) (hw) (hx) (hy) (hz) (ia) (ib) (ic) (id) (ie) (if) (ig) (ih) (ii) (ij) (ik) (il) (im) (in) (io) (ip) (iq) (ir) (is) (it) (iu) (iv) (iw) (ix) (iy) (iz) (ja) (jb) (jc) (jd) (je) (jf) (jg) (jh) (ji) (jj) (jk) (jl) (jm) (jn) (jo) (jp) (jq) (jr) (js) (jt) (ju) (jv) (jw) (jx) (jy) (jz) (ka) (kb) (kc) (kd) (ke) (kf) (kg) (kh) (ki) (kj) (kk) (kl) (km) (kn) (ko) (kp) (kq) (kr) (ks) (kt) (ku) (kv) (kw) (kx) (ky) (kz) (la) (lb) (lc) (ld) (le) (lf) (lg) (lh) (li) (lj) (lk) (ll) (lm) (ln) (lo) (lp) (lq) (lr) (ls) (lt) (lu) (lv) (lw) (lx) (ly) (lz) (ma) (mb) (mc) (md) (me) (mf) (mg) (mh) (mi) (mj) (mk) (ml) (mm) (mn) (mo) (mp) (mq) (mr) (ms) (mt) (mu) (mv) (mw) (mx) (my) (mz) (na) (nb) (nc) (nd) (ne) (nf) (ng) (nh) (ni) (nj) (nk) (nl) (nm) (nn) (no) (np) (nq) (nr) (ns) (nt) (nu) (nv) (nw) (nx) (ny) (nz) (oa) (ob) (oc) (od) (oe) (of) (og) (oh) (oi) (oj) (ok) (ol) (om) (on) (oo) (op) (oq) (or) (os) (ot) (ou) (ov) (ow) (ox) (oy) (oz) (pa) (pb) (pc) (pd) (pe) (pf) (pg) (ph) (pi) (pj) (pk) (pl) (pm) (pn) (po) (pp) (pq) (pr) (ps) (pt) (pu) (pv) (pw) (px) (py) (pz) (qa) (qb) (qc) (qd) (qe) (qf) (qg) (qh) (qi) (qj) (qk) (ql) (qm) (qn) (qo) (qp) (qq) (qr) (qs) (qt) (qu) (qv) (qw) (qx) (qy) (qz) (ra) (rb) (rc) (rd) (re) (rf) (rg) (rh) (ri) (rj) (rk) (rl) (rm) (rn) (ro) (rp) (rq) (rr) (rs) (rt) (ru) (rv) (rw) (rx) (ry) (rz) (sa) (sb) (sc) (sd) (se) (sf) (sg) (sh) (si) (sj) (sk) (sl) (sm) (sn) (so) (sp) (sq) (sr) (ss) (st) (su) (sv) (sw) (sx) (sy) (sz) (ta) (tb) (tc) (td) (te) (tf) (tg) (th) (ti) (tj) (tk) (tl) (tm) (tn) (to) (tp) (tq) (tr) (ts) (tt) (tu) (tv) (tw) (tx) (ty) (tz) (ua) (ub) (uc) (ud) (ue) (uf) (ug) (uh) (ui) (uj) (uk) (ul) (um) (un) (uo) (up) (uq) (ur) (us) (ut) (uu) (uv) (uw) (ux) (uy) (uz) (va) (vb) (vc) (vd) (ve) (vf) (vg) (vh) (vi) (vj) (vk) (vl) (vm) (vn) (vo) (vp) (vq) (vr) (vs) (vt) (vu) (vv) (vw) (vx) (vy) (vz) (wa) (wb) (wc) (wd) (we) (wf) (wg) (wh) (wi) (wj) (wk) (wl) (wm) (wn) (wo) (wp) (wq) (wr) (ws) (wt) (wu) (wv) (ww) (wx) (wy) (wz) (xa) (xb) (xc) (xd) (xe) (xf) (xg) (xh) (xi) (xj) (xk) (xl) (xm) (xn) (xo) (xp) (xq) (xr) (xs) (xt) (xu) (xv) (xw) (xx) (xy) (xz) (ya) (yb) (yc) (yd) (ye) (yf) (yg) (yh) (yi) (yj) (yk) (yl) (ym) (yn) (yo) (yp) (yq) (yr) (ys) (yt) (yu) (yv) (yw) (yx) (yy) (yz) (za) (zb) (zc) (zd) (ze) (zf) (zg) (zh) (zi) (zj) (zk) (zl) (zm) (zn) (zo) (zp) (zq) (zr) (zs) (zt) (zu) (zv) (zw) (zx) (zy) (zz)

which compared the effects on learning of the different kinds of introductions. It was his contention that introductions could be divided into two broad categories, those which motivate the audience, and those which direct their attention.

The motivating kind of introduction is considered as one which will prepare the audience for what is to be presented in the future. It allows time for the audience to become adjusted to the theatre conditions or conditions of the room in which the picture is to be shown, such as darkness, quietness, and seats. It is believed that this kind of introduction is best served by being presented in a form representing a life-like situation. (47)

The other kind of introduction is one in which the attention is directed to the main points to be covered in the subsequent film. This kind of introduction calls to the attention of the audience the high lights and principal concepts of the film, and directs the attention of the audience to these points. New and pertinent information is presented in the introduction, but in a much briefer form than that which follows in the body of the picture. (47)

Lathrop (33) developed an experiment which was directly concerned with measuring the effect on learning of the introductory sequences of several typical instructional films. From a review of one hundred and thirty instructional films, he selected three which appeared to contain the best avail-





able introductions. The films dealt with topics of general interest but widely separated as to subject matter. Two experimental versions were prepared for each of the three films: Version I was the complete film; Version II was the same film minus the introductory sequence only. The main title and credit titles were included in both versions of each film.

To properly evaluate his experiment, Lathrop (33) constructed tests on the material in each of the three films, such questions bearing on the facts in the body of the film only. He asked no question on the facts contained only in the introduction. However, multiple-choice test questions, each with four choices, were asked on three different classes of facts in the films:

1. The facts contained in the photographic images only.
2. The facts contained in the sound track only.
3. The facts found in both the images and sound track.

Pilot-runs were made to check the validity and reliability of the tests, and poor questions were eliminated. Each test finally included from fifty to sixty items.

Approximately five hundred ninth grade high school students took part in the experiment. They were divided into three experimental groups each containing a uniform number of boys and girls. One group acted as a control group and took the test without seeing a film. The second group saw the complete film (Version I), while the third group saw the

side investigations. The first main point of interest  
 interest but which appeared to be highly relevant. The  
 experimental conditions were prepared for each of the three  
 effects. However, I was not aware of this feature if not  
 the same this stage the investigation requires only. The  
 main factor and which factor were included in each condition  
 we were able to determine the effect of the factor.  
 The previously available data indicated, however, that the  
 directed effect of the subject in each of the three trials.  
 some questions bearing on the factor in the study of the trial  
only. The need to consider on the factor included only in  
 the investigation. However, multiple-choice tests of choice,  
 each with four choices, were asked on three different  
 classes of tests in the study.  
 1. The tests included in the psychological domain only.  
 2. The tests included in the social domain only.  
 3. The tests included in both the social and social domain.  
 The results were able to show the validity and reliability  
 of the tests, and some questions were answered.  
 Each test finally included three trials in every item.  
 Approximately five hundred trials were given each of the  
 three main parts in the study. They were divided into  
 three subgroups of trials with including a certain number  
 of trials and trials. The trials were as a control group and  
 from the last of the study a trial. The control group was  
 the control of the (control), while the other group was the



"no-introduction" version (Version II). The groups were rotated so that each group became a different experimental group for each of the three films. Thus, each group acted as a control group for one film, as a group seeing the version without the introduction for another, and finally, as a group seeing the entire film for the third. The groups were also rotated with respect to projection rooms and test administrators.

The test followed immediately upon the film-showing. Twenty-five minutes were allowed for its completion. Thus, a single forty-five minute period provided ample time for showing a film and giving the test.

A survey of the results obtained from Lathrop's (33) experiment indicates that the groups which saw the experimental films generally did somewhat better than the control groups which did not see the films. However, the differences between the groups which saw the entire film, and those saw the film minus the introduction were small. For two films the introductions apparently made small positive contributions, while for the third film the introduction seemed to have an adverse effect on learning. This latter unexpected result was carefully checked and proved to be authentic.

From these results, it becomes evident that among existing films, typical introductory sequences can make small positive contributions to learning, while in other instances,

"Developmental" version (version II). The groups were re-  
 labeled on that date. Group became a different experimental  
 group for each of the three films. Thus, each group acted  
 as a control group for one film, as a group seeing the two-  
 film version and the development for another, and finally, as a  
 group seeing the entire film for the third. The groups were  
 also rotated with respect to projection room and time of

exhibition.

The last rotation immediately after the film-seeing.  
 Twenty-five minutes were allowed for the development. Then,  
 a single forty-five minute period provided ample time for  
 showing a film and giving the test.

A survey of the results obtained from Lashley's (1931)  
 experiment indicates that the groups which saw the experi-  
 mental film generally did somewhat better than the control  
 groups which did not see the film. However, the differ-  
 ences between the groups which saw the entire film and  
 those who saw the film alone are statistically very small. For  
 two films the differences are apparently small positive  
 comparisons, while for one film the differences  
 seemed to have an adverse effect on learning. This latter  
 unexpected result was carefully checked and proved to be

reproducible.

From these results, it seemed evident that many other  
 and films, typical introductory experiments can be made  
 possible contributions to learning, while in other instances,

introductions may have an adverse effect on learning, possibly through misdirecting the student's attention. This tends to show that there is an urgent need for an experimental approach to the problems of producing film introductions, based on sound learning principles, which will make positive contributions to learning. These should help to offset shortcomings in methods of presentation when using films to supplement instruction, or as an exclusive means of instruction. The next step in this direction could be an evaluation of the relative importance of the different functions which a film introduction might perform. (33)

In order to properly round out Lathrop's (33) investigations, Horford (33) conducted a similar experiment which paralleled this research on film introductions. This parallel study was an attempt to evaluate the effectiveness of the summary in some typical instructional films, and to suggest what functions the film summary might be expected to perform in order to improve the film as an instructional tool.

The term "film summary" can be defined as a concluding sequence produced as an integral and purposeful part of the educational sound motion picture, which embraces one or more of the functions of review, recapitulation, statement of importance, and/or the issuing of a challenging note; it may also contain an "application" of the information, or contain new information not previously given in the film. The sum-



investigations may have an adverse effect on learning, possibly by simply distracting the student's attention. This would be true if there is no useful need for an experimental approach to the process of learning from investigations, based on actual learning principles, which will make positive contributions to learning. These would help to offset shortcomings in terms of understanding when using them to supplement instruction, or as an essential means of instruction. The best step in this direction would be an evaluation of the relative importance of the different functions which the investigation can perform. (25)

In order to be really useful for learning (26) investigation should, therefore, be conducted in a similar manner to that detailed in this research on the investigation. This detailed study was an attempt to evaluate the effectiveness of the summary in some typical instructional films, and to suggest what functions the film summary might be expected to perform in order to improve the film as an instructional tool. The term "film summary" was defined as a condensing sequence produced as an integral and purposeful part of the instructional film, which summarizes the main points of the functions of review, reinforcement, assessment of performance, and for the purpose of a challenging move to the next stage in the "application" of the information, or possibly new information not previously given in the film. The sum-

mary is usually preceded by a fade-in of the photographic image, and a natural break in the sound track, which separates it from the body of the film proper. It does not include THE END title. (33)

Norford's (33) procedure for conducting the experiment on film summaries was identical with that used by Lathrop (33) for the film introduction research. The only basic differences were in the film subject matter and the type of test questions presented to the population involved. The results of the film summary experiment were similar to the introduction experiment in that the groups which saw the films definitely did better on the tests than the control groups which did not see the films. The differences were small between the groups which saw the complete films, and those which saw the films minus the summaries. For all three films the summaries apparently made small positive contributions to learning.

From these results on film summaries it is possible to deduce that these films, which included what seemed to be the best available summary sequences as produced today, are not materially better than they would be without the summaries. Nevertheless, in view of the fact that a review or summary of a lesson is generally accepted as being beneficial to learning, it is reasonable to assume that better results should be expected to accrue from film summaries. This, then, suggests the urgent need for some experimental work on the





problems of producing film summaries, based on established learning principles, which will be more effective aids to learning, than the film summaries which were tested. (33)

Meaningfulness-adequate emphasis on details. That there is among films a difference in content difficulty is a readily observable fact. There are at least four general sets of factors which would influence difficulty so far as any given group of viewers is concerned. These are: (1) Familiarity of the viewers with the subject matter of the film, (2) characteristics of the presentation of the material, (3) rapidity with which ideas are presented to the viewers, (4) difficulty of the ideas presented when familiarity with the subject is constant. (43)

There is also a difference in the length of films. However, in producing films, characteristics of length have been decided largely upon the basis of considerations other than those relating to instructional effectiveness. The question of how long a film should be to attain maximum instructional effectiveness cannot at present be answered except on the basis of a priori judgments. (43)

Both length and idea frequency are themselves related in a very practical way. The contents of a film (the total number of ideas, concepts, or facts which it presents) may be spread over a long period of time. The number of ideas, concepts, or facts presented in relation to the total length is a measure of the "idea frequency" of a film. Ideas, con-



cepts, or facts themselves vary in difficulty, so that one idea is not necessarily the equivalent of another idea. Therefore, a method of content analysis is needed which will meet certain standards of reliability and validity. (43)

Faced with the question whether or not increasing the concentration of facts in a film would result in a proportionate increase in learning, Vincent, Ash, and Greenhill (51) conducted a research in order to determine the effect on learning of varying: (1) The total amount of factual information presented in a film of a given length, and (2) the length of time allotted to conveying a fixed amount of information.

Four experimental film versions dealing with the causes and manifestations of the weather were made up from a series of Navy training films on aerology. The Long Heavy version ran 29 minutes and contained 224 facts; the Long Light version also ran 29 minutes but contained 112 facts. The Short Heavy version ran 14 minutes and contained 112 facts; the Short Light version ran 14 minutes but contained 56 facts. The total number of words in each pair of equal length kept constant by the use of repetitions, introductory statements, and other "filler" material which did not add new facts.

The four experimental versions were shown to four groups in each of three different populations, High School students (12th grade), Air Force basic trainees, and College students. In each population a fifth control group did not see the film.



which, as these individuals vary in difficulty, so that the  
idea is not necessarily the expression of another idea.  
Therefore, a system of abstract analysis is needed which  
will meet certain standards of reliability and validity. (23)  
Based on the preceding analysis of the literature, the  
methodology of this study is a film study which is a system-  
atic analysis of literature, film, and especially  
(24) presented a research in order to determine the effect  
of learning in terms: (1) the social norms or moral in-  
formation presented in a film of a given length, and (2) the  
length of the film itself in conveying a fixed amount of  
information.

Four experimental film versions dealing with the same  
and similarities of the action were made up from a series  
of very similar films on ecology. The first series  
was 22 minutes and contained the first film. The second  
film was 25 minutes and contained the second film. The third  
series was 18 minutes and contained the third film. The  
fourth series was 14 minutes and contained the fourth film.  
The total number of words in each part of each series was  
constant of the use of repetition, introductory statements,  
and other "filler" material which did not add length.  
The four experimental versions were shown to four groups  
in each of three different populations, high school students,  
(high school), the lower grade students, and college students.  
It was hypothesized a film version group did not see the

All groups took the same 136 item multiple-choice question information test. The High School and Air Force groups took the test again after delays of four weeks and seven weeks respectively.

From their experiment, Vincent, Ash, and Greenhill (51) were able to ascertain that significant learning did occur. Every group which saw an experimental film earned a substantially higher score than the control group which did not see a film. The "best" version in an all-around sense, on the basis of total score, differed from population to population. For the High School sample the Short Heavy version seemed to be the most effective, for the Air Force and College samples the Long Light version seemed to be most effective. At the end of the delayed recall period, all differences among the versions were much smaller than they had been on the immediate retention test, and most of them were not significant.

It is apparent from the data gathered by Vincent, Ash, and Greenhill (51), that packing more and more information into a film yields only very slight increments in total measured learning. In no case did the Long Heavy film group learn anything approaching twice as much as the Short Heavy or Long Light groups, nor did the latter learn twice as much as the Short Light group. Moreover, an analysis of the test performance suggested that the films were rather difficult for the populations in spite of the fact that the reading





level of the scripts was at the 7th or 8th grade.

Patterning-Temporal patterns. In a broad sense, it can be said, that there are two great areas for research involving the sound motion picture: (1) the complex streams of events which occur in the sequences of pictures, and (2) the equally complex streams of events which occur in the sound track or commentary. These two streams of events, as they are channeled through the sensory processes of seeing and hearing, meet and merge in the brain. Here the problems arise of how these varieties of stimuli interact, integrate, reinforce or inhibit the communication of meanings.

This area of research is extremely complex and difficult. The meaningful definition of even a few of the problems and the isolation of some of the variables is no mean achievement. Zuckerman (53) in his research project covering this category, has not only defined several important variables, but he has also developed experimental designs which have led to significant new viewpoints which producers of instructional films may wish to consider in the future.

In instructional film production today, the following assumptions may be made with some increased degree of confidence: (1) There can be too much talk as well as too little in film commentaries, (2) the pronouns or forms of address make for differences in the instructional effectiveness of a film, and finally, (3) in the production of a sound

level of the country was at the time of the study.

Reliability of the data. In a recent paper, it was  
 be said, that there are two main areas for research investi-

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motion picture intended to give training in skills, serious consideration should be given to the problem of the timing of the verbal directions (or cues) with the visual directions (or cues). It may be suggested that either the visual or sound cues should be given a time priority, depending upon their relative importance at various points in a film for instructing trainees in the performance of the task. (51)

(44)

Zuckerman (53) conceived the hypothesis that a perceptual-motor task such as knot tying, could be taught by means of motion pictures alone, and that verbal descriptions of the acts involved in the skill would increase the effectiveness of the instructional film, that is, the commentary would increase learning. In some respects, Zuckerman's work paralleled that of Hoshal's (45), previously discussed in this chapter, however, Zuckerman's objective was the level of verbalization needed to effect learning rather than the realism of the photographic presentation.

It was Zuckerman's (53) purpose to determine the effects of three kinds of variations in the commentary of instructional films, dealing with the learning of knot-tying tasks. Various levels of verbalization of the action and relationships of parts occurring in films demonstrating the tying of the bowline, sheet bend and Spanish bowline, were tested. Two other types of variations were also investigated: The use of different kinds of personal pronouns (personal ref-





erence) in the commentary, and the role played by the phase relations of the picture and sound.

The variables were designed as follows:

1. Levels of verbalization: None, low, medium, high.
2. Personal reference: First person, second person, third person passive, and imperative.
3. Phase relationships: Sound leading the picture, sound lagging behind the picture.

To carry out his experiment, Zuckerman (53) used specially produced experimental motion pictures demonstrating the tying of the three knots (bowline, sheet bend, and Spanish bowline) and had them shown to groups of Naval trainees. He had 1787 men divided into groups of about sixty, and ran comparisons through pairs of these experimental groups. The test of learning was the actual performance of the knot-tying tasks immediately after a film-showing of each knot. After a liberal time allowance for the tying, the correctly tied knots were counted.

From his experiments, Zuckerman (53) found that, in terms of the proportion of subjects tying the knots correctly, the film with no sound was the weakest of all the experimental versions. However, in the low level verbalization film, the addition of descriptions of the main movements used in tying the knots increased the number of correctly tied bowlines and Spanish bowlines, while it had no significant effect on the number of sheet bends. This can be explained

examined in the commentary, and the role played by the presence of the victim and sound.

The following were designed as follows:

1. Levels of verbalization: none, low, medium, high.
2. Verbal responses: first, second, third, fourth.
3. Third person: passive, and imperative.
4. Three relationships: sound leading the viewer, sound leading behind the viewer.

To carry out the experiment, a 2x2x2x2x2x2 factorial-

if presented separately, each of the six dimensions of the design of the three levels (position, sound level, and verbalization) and one factor to groups of three subjects. The total 128 was divided into groups of about 12, and two comparisons through pairs of three experimental groups. The rate of learning was the verbal performance of the subjects. The results were immediately after a 15-minute rest of each trial. After a final time difference the two trials, the subjects had been were needed.

From the experiment, a 2x2x2x2x2x2 factorial design of the presentation of subjects (the three subjects) and the time to the sound was the subject of all the experimental conditions. However, in the first condition, the addition of association of the two movements and in the second condition the number of words used in the first and second trials, while it had no significant effect on the group of words used. This can be explained



by the fact that tying the sheet bend requires some intricate orientation of the tying lines, which was not brought out at this level of commentary. In terms of the numbers of subjects tying all three knots correctly, the medium level verbalization film was the best of those in the verbalization series. This version was produced by the addition of cues of orientation to the commentary contained in the low verbalization film, which gave information about the crossing of lines to the right or left, formation of loops above or below lines, and similar directions. It was interesting to note that the addition of detailed descriptions of the appearance of parts in the high level verbalization film not only did not improve performance but caused a distinct drop in the proportion of correctly tied knots. Although learning from this film was almost identical with that from the low verbalization version, it was still better than that for the no sound film.

In regard to personal references, it was found that, based on the proportion of knots correctly tied, the film using the first person ("I") was third in order of the films in this section of the experiment. But it did not differ significantly from the others. The film version using the second person ("You") was equal in effectiveness to the film containing the imperative mood, and these two films turned out to be the best in the series in terms of the proportion of the subjects tying the knots. The least effective film



in the group was the one using the third person passive ("A loop is formed..."). It differed from the film using the imperative mood and the second person in that a significantly lower number of subjects tied the knots correctly. The film which used the imperative mood("Form a loop...") was equal in effectiveness to that film containing the second person, and both these films were on a par as the most effective in the series.

From the standpoint of phase relationships, the overall results from using the two films in this group demonstrated that the film with the sound leading the picture, that is, where the commentary slightly precedes the visual representation it describes, was superior to the film in which the commentary follows slightly behind the visual representation on the screen. When the analysis for each individual knot was made, however, it was found that results for the Spanish bowline presented the only statistically significant difference. This may be explained by the varying levels of difficulty of the three knots. There were more cues in the Spanish bowline commentary than in those for the other two knots. This was necessary because the sequence of knot-tying movements was relatively more complex for the Spanish bowline.

The exploratory nature of Zuckerman's (53) experiment places restrictions on its interpretation, as do the nature of the task and the brevity of the experimental films. Even





with these limitations, the following conclusions seem justified:

1. In teaching knot-tying tasks by means of instructional films, some verbal descriptions of the acts assist the learner, but verbalization may be increased to a point where it interferes with and actually reduces learning.

2. With a military population in an authoritarian atmosphere, directive statements using the imperative mood or the second person active are more effective than first or third person in promoting learning. Oddly enough, third person passive statements, which are commonly used in film commentaries, proved to be least effective.

3. The phase relationships of the auditory and visual elements in sound films teaching knot-tying had an important bearing on the effectiveness of the films. It is possible that this timing variable is closely related to the level of difficulty and complexity of the task. Further research is needed to ascertain the procedures for determining the optimal phase relations of picture and commentary in sound films.

Based on the above conclusions, it might be advisable to tentatively offer a few pertinent suggestions for use by interested film writers, directors, and film project officers. In the first place, it must be recognized that there is an optimal level of verbalization in the commentary; care should be taken not to load the sound track with too much verbal detail, nor, on the other hand, should verbal descrip-

also these limitations, the following considerations were raised:

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22. In

23. In

24. In

25. In



tions of crucial visual relationships be omitted. Moreover, for military trainees accustomed to direct orders, strong directive statements may be more desirable for promoting learning than passive statements. There is some evidence that the personalization of commentary by use of the second person ("You") is helpful. Finally, where the learner must be alerted to a visual relationship or detail, some advance direction in terms of seconds of commentary lead is desirable. (53)

#### IV. THE PRINCIPLE OF EFFECT

Demonstration of wrong method. Until recently there has been an almost complete lack of research that studied the characteristics of films themselves. The question of how much "better" or "worse" instructional films are than some other medium has been dealt with often. The question of what are the necessary characteristics of a "good" or "better" teaching film, has been posed only rarely.

Since 1947, several studies have attacked problems of the characteristics of the film itself. As previously discussed, Roshal (45) dealt with the relative effectiveness of several ways of handling the visual material or pictures, and Zuckerman (53) dealt with characteristics of the commentary or sound track. These and other studies showed that the effectiveness of instructional films is in large measure a function of film techniques employed. The studies showed



clearly that some film variables yielded more learning than others. (25)

As an early step in this kind of research, Jaspen (25) undertook to investigate the relative effects on learning of certain characteristics or variables in films designed to teach an assembly skill. A basic preliminary question which he devised to be answered was: What characteristics should training films have so that, by themselves and without help from instructors or books, they may be used to teach effectively in an emergency situation?

For his project, Jaspen (25) selected the assembly of the breech block for the 40mm antiaircraft gun as the particular skill to be taught through the film medium. The particular learning variables which he studied were Verbalization, Rate of Development, Nomenclature, Errors, "How-it-Works", and Repetition. These variables may be defined as follows: (5) (25)

1. Level of Verbalization refers to the amount of narration used to describe the action of a film (expressed in average number of words per minute of film). Where the action of a film is the simple demonstration of an assembly task, Level of Verbalization is a relationship between how much is said and how much is demonstrated or done pictorially. If each frame (or each minute) of a film is part of the demonstration, then the amount demonstrated can be expressed in minutes, and Level of Verbalization can be expressed as



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as an early step in this line of research, Japan (1952)

[illegible]

1. Level of individuality refers to the amount of individuality that is expressed in the behavior of a film character. In average movies of today (for instance of 1930), there is a great deal of individuality in the behavior of the characters. In the level of individuality is a relationship between the individual and the group. In this and how much is determined by the character. It is not true for each character of a film is part of the individual, that the group character is not in the individual. In the level of individuality is a relationship between the individual and the group. In this and how much is determined by the character. It is not true for each character of a film is part of the individual, that the group character is not in the individual.

average number of words per minute of film.

2. Rate of Development is the speed or tempo with which a given amount of material is covered pictorially. If one picture used four hundred feet of film to demonstrate how to assemble a breech block, and a second picture used eight hundred feet of film to demonstrate how to assemble a similar breech block, then the first film had a faster rate of development than the second. In other words, it took half as much time. The increase in film footage (or time) may be the result of taking more shots, letting the camera run longer for each shot, or a combination of more and longer shots. In manipulating this variable in Jaspen's experiment, sound tracks were varied only as much as necessary to correspond with the pictorial sequence.

3. Nomenclature refers to the use of the technical names of the parts of the breech block.

4. Errors are illustrated by the showing of common errors to be avoided in performing the assembly task.

5. "How-it-Works" is the use of a film sequence showing the principles of operation and function of the breech block.

6. Repetition refers to the number of times the basic demonstration of the assembly task is presented in a film.

With verbalization and rate of development, Jaspen (25) established degrees for comparative investigation: High and low verbalization, slow and fast rates of development. In the case of nomenclature, errors, and "how-it-works", the

average number of words per minute of 120.

2. This of course is the speed on paper and

which a given amount of material is covered, obviously,

It has been found that the speed of film is about

about 100 to 120 words per minute, and a second picture

may show a picture of the same scene as the first

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presence or absence of these variables in the film were compared. For example, a film has, or does not have the sequence showing errors to be avoided; a film has, or does not have the technical names of the parts; a film has, or does not have a sequence showing how the device works. With regard to repetition, a film depicted one, two, three, or four demonstrations of breech block assembly.

To provide for an evaluation of the effectiveness of these variables, seventeen versions of a film designed to teach assembly of the breech block were produced. A film version contained a planned pattern of variables. Jaspen's (25) problem, then, was to determine which degree of each variable was the more effective, and which, among the six variables, were the more significant in making an instructional film of this type more effective.

In order to carry out his experiment, Jaspen (25) was given permission to select apprentice seamen at the Naval Training Station, Great Lakes, Illinois, to whom were shown the experimental film versions.

Thirty men were selected from each of eighty-one companies, on the basis of age, education, Navy General Classification test score, and Navy Mechanical test score. All of the men selected were aged between 16 years, 8 months, and 21 years, 8 months. They had had at least six years of formal education; they had Navy General Classification test

There is no doubt that the Government is in the right in its  
policy. The people, as a whole, are not yet ready to  
accept the Government's policy. It is a pity that the  
Government is not more active in its policy. It is a pity  
that the Government is not more active in its policy. It is a  
pity that the Government is not more active in its policy.

The Bureau has no objection to the release of the information contained in the above report, provided it is used for official purposes only.

Training Review: David Jones, Illinois, no longer sets strong given revelation to select expression across 46 The Study. In order to carry out his assignment, James (190) was

[illegible]

scores not lower than 40 and not higher than 60, and the Mechanical Aptitude scores were established at identical levels. These requirements insured that the groups selected for training and testing would be comparable and homogeneous. Homogeneity was further achieved by restricting the experimental population to those individuals whose combined General Classification Test and Mechanical Aptitude scores totalled between 90 and 110.

A detail of proctors was assigned to the experiment for each week of the study. Each detail consisted of thirty-six men. This included a proctor for each of the thirty assemblers being tested at a given time. Proctors were selected only from companies which did not provide assemblers; their "GCT" scores were for the most part, superior (above 60). Each detail of proctors was given four hours of instruction in reading standardized instructions, operating a stop-watch, keeping records, scoring breech block assembly, and other necessary skills.

The experiment was executed by giving a standard motivational speech to each group of thirty men. The thirty men were then shown one of the film versions. After the film showing, the men were directed to the testing room, which was equipped with ten long tables. On the tables, for each man, was a Test Record Sheet, with the man's name and service number and a number identifying the proctor assigned to test him. When all the assemblers were in their assigned positions,



groups and teams were formed in the first half of 1940, and the experimental groups were established at intervals. These experiments showed that the groups selected for training and testing would be representative and homogeneous. Homogeneity was further assured by restricting the experimental population to those individuals whose assigned mental characteristics were the same and whose physical characteristics were similar between 50 and 110.

A detail of subjects was assigned to the experiment for each week of the study. Each detail consisted of thirty-six men. This included a provision for each of the thirty-six subjects being tested at a given time. Provisions were made to keep these subjects which did not involve assignment to their group, were for the most part, separate from the detail of subjects and given four hours of instruction in reading standardized instructions, operating a stop-watch, keeping records, keeping track of time, and other necessary skills.

The experiment was conducted by giving a standard mental speed test to each group of thirty men. The results were then shown one of the five versions. After the first showing, the men were divided into five groups, which were retested with the same test. Of the fifteen, the men were then divided into three, and the men's first and second results were compared. The results of the experiment were then compared with a number of other results in the past. From all the experiments were in their various positions.

a signal was given for the testing to start. Proctors read a standard set of directions, laid out the parts of the disassembled breech block in a standardized pattern, and told the assemblers to begin work. An assembler was timed from the moment he touched the first part until he completed the assembly. The proctor recorded his time (in seconds) for each of ten assembly trials. If an assembler failed to assemble the block in ten minutes, it was disassembled and he was told to try again. If he succeeded the second time, he continued for a total of ten trials. If he failed, he was dismissed, and his performance was recorded as a failure.

As a result of his experiment, Jaspen (25) was able to establish that learning does occur exclusively from film instruction. In the case of the most effective films, as many as 98% of the subjects succeeded in learning to assemble the breech block within a time limit of ten minutes. It is interesting to note that in a follow-up study to this experiment, only 15% of a control group which received no instruction whatever was successful in assembling the breech block in a ten minute trial. (26)

The experiment results further showed that the different films varied greatly in effectiveness. Less than half the subjects who saw the least effective version were able to complete the assembly within the first ten minutes; the median time for this group was 749 seconds. The median for the most effective film was 101 seconds.

a signal was given for the starting of work. The four years  
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 observations, which were in a standardised manner, and  
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By arranging the film versions in order of effectiveness as measured by the criterion of mean speed, Jaspen (25) found the following to be true:

1. The most effective version had a slow rate of development, showed errors, and included three assembly demonstrations.

2. The second most effective version had a slow rate of development, showed errors, and included three assembly demonstrations.

3. Of the next four most effective versions, each had similar slow rate of development, showed errors, and included two assembly demonstrations.

4. There were seven other versions which revealed a diminishing order of effectiveness. Each of these included either a slow rate of development or errors but not both. Each included two assembly demonstrations.

From the results of Jaspen's (25) experiment, there appears to be a justification for some basic conclusions and recommendations concerning films designed to teach an assembly task of the kind used in his study.

Fundamentally, a slow rate of development is apparently a most important factor in making a teaching film effective. New material in films should be covered pictorially at as slow a speed as is consistent with other considerations. In general, this speed would be slower than is customary in present production practice. Repetition of the demonstration

by analyzing the time variation in order of efficiency-  
ness as measured by the duration of each speed tested (in)  
times the following to be known:

1. The most efficient variation had a time rate of devel-  
opment, almost equal, and included both primary and  
secondary.

2. The second most efficient variation had a time rate of  
development, almost equal, and included both primary  
and secondary.

3. The third most efficient variation, which had  
similar time rate of development, almost equal, and included  
both primary and secondary.

4. There were three other variations which presented a  
disturbance in the order of efficiency, and in these included  
either a time rate of development or error rate not high.  
This included the secondary development.

From the results of Taylor's (191) experiment, which ap-  
pears to be a variation from the main hypothesis and  
recommendations concerning time needed to learn an ex-  
ercise, it can be seen in his study.

Furthermore, a time rate of development is apparently  
a most important factor in learning this exercise.  
The material in this study is reported according to it  
also a speed as is indicated with other experiments.

In general, this study would show that it is necessary to  
present the material, practice, repetition of the development

of the task should add considerably to the teaching effectiveness of a given film, even when the film is otherwise already effective. It should be recommended that repetition of basic sequences within the film, perhaps with variations, be made part of the design of films which are intended to teach assembly tasks. There are indications that the showing, in the film, the common errors to be avoided, increases the instructional effectiveness of a given film. It should also be recommended that, in addition to showing right ways to perform a task, films also point out common errors to be avoided. The use of technical nomenclature does not appear to facilitate the learning of an assembly skill and may actually interfere with such learning. If technical nomenclature must be used in films, it should be recognized as constituting an additional teaching burden, and the film treatment should be extended accordingly.

In the final analysis, therefore, it can be concluded that a suitable film which makes use of a slow rate of development, repetition, and the pointing out of errors, can, by itself, teach with a high degree of effectiveness. In Jaspen's (25) experiment, 98% of the men who saw a single showing of such a film and who received no other instruction, learned how to assemble the breech block.

## V. CHARACTERISTICS OF THE LEARNER

Learning through eye or ear. A casual observation of the



of the same kind and magnitude as the learning effect-  
 iveness of a given time, even when the time is distributed  
 almost equally. It should be recommended that the  
 time of each response within the time, however, be kept  
 almost, or with part of the design of time when the in-  
 tended to learn something better. There are indications that  
 the student, in the time, the common error is to avoid  
 learning the fundamental effectiveness of a given time.  
 It should also be recommended that, in addition to having  
 right ways to perform a task, time also be used for common  
 errors to be avoided. The use of technical generalizations  
 does not appear to facilitate the learning of an assembly  
 skill and may actually interfere with such learning. It  
 technical generalizations must be used in time, it should be  
 recognized as contributing an additional learning system,  
 and the time learning should be extended accordingly.  
 In the time learning, however, it can be concluded  
 that a multiple time which makes use of a slow rate of devel-  
 opment, repetition, and the solving out of system, and, of  
 itself, leads to a high degree of effectiveness. In  
 Langer's (1951) experiment, 50% of the time was a single  
 session of work a time and was received no other instruction.  
 Langer has to conclude the present study.

# V. APPLICATIONS TO THE FUTURE

Learning through use of time. A general description of the

techniques employed by many of today's instructional film producers reveals, that they aspire to communicate principally through the pictorial "language" of the sound film and to use the sound commentary merely to reinforce the pictorially presented meaning. However, preliminary tests of learning from current sound films have indicated that the principal burden of factual communication in the majority of these films is carried by the stream of events of the sound commentary. Regardless of evaluations of the relative importance of the picture versus the sound commentary, strict investigations of the commentary are very pertinent to the objectives of any film research program. (4) Of course, it would be valuable to know the relative efficiency of the two film channels, visual and auditory, so that if one could be demonstrated to be more efficient than the other, more emphasis could be given to this channel in making a film. However, this imposes extremely difficult experimental problems. Experimental films would have to be produced which contained equal numbers of visual and auditory items, and it would be necessary to find some way of knowing that these items are of equal difficulty. To have unequal numbers of video and audio items would be unsatisfactory, because it is probably easier to learn a high proportion of a small number of items than it is to learn a high proportion of a large number of items. (33)

In order to develop some insight into this problem and

technical analysis by way of today's technological state  
 of knowledge, that they ought to be considered as  
 being among the general "language" of the world. It  
 may be one of the second necessary steps to achieve the  
 scientific movement. However, previously, before  
 of reaching this stage, some time has been wasted in  
 the physical position of logical communication in the world.  
 If at this time is reached by the above it seems to be  
 most necessary, regardless of whether or not the relative  
 importance of the above errors for some countries,  
 which is involved in the movement of the world.  
 In the objective of any this research project, it  
 seems, it would be possible to have the relative efficiency  
 of the two life sciences, social and natural, so that it  
 can be of assistance to be more efficient than the  
 other, more efficient would be given to the natural life sci-  
 ence. However, this is not necessarily difficult to  
 understand. Experimental life science have to be  
 concerned with natural and social sciences of natural and social  
 life, and it would be necessary to find some way of  
 knowing that these two are of equal difficulty. To have  
 natural sciences of life and social sciences would be possible.  
 Therefore, because it is probably better to have a high pro-  
 portion of a small number of life than it is to have a  
 high proportion of a large number of life. (14)

In order to develop new fields into this problem and



thereby provide a departure point for more detailed study, Nelson and Moll (38) have conducted two experiments in which the effectiveness of the auditory and visual elements in instructional films was compared so that relative contributions to learning by these elements could be studied. Two films dealing with aerodynamics (Theory of Flight and Problems of Flight) were used in one experiment; the other experiment used a film entitled Land and Live in the Desert, portraying desert survival procedures.

Multiple choice item tests were constructed covering the information in each film. Some of the items were based on information contained in the visuals, others were based on the commentary, and items in a third group were based on information to be found in both the visual and auditory channels. Some of the items in the test were in picture form, the others were verbal.

The aerodynamics films study used 430 Army Reserve Officer trainees divided into eight test groups as follows:

Group A (control group) did not see or hear either film.

Group B saw and heard Theory of Flight only.

Group C saw and heard both films.

Group D saw and heard Theory of Flight, but only saw Problems of Flight.

Group E-1 saw and heard Theory of Flight, but only heard Problems of Flight in the dark.

Group E-2 saw and heard Theory of Flight, but only heard Problems of Flight in the light.

These results are reported below for each subject group.

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The following are the results for each subject group.

Group F only heard both films (in the dark).

Group G only saw both films (no sound).

The desert survival film experiment used 388 college students divided at random into five test groups as follows:

Group C (control group) did not see or hear the film.

Group AL only heard the film in the light.

Group AD only heard the film in the dark.

Group V only saw the film (no sound).

Group B both saw and heard the film.

After the means of the group test scores were compared, Nelson and Moll (38) were able to determine that in every case the groups which had some film treatment were better than the control groups which did not see or hear any film. Furthermore, the groups which both saw and heard a film were better than the groups which only saw or only heard the film. In both studies, it was found that hearing the sound track in the dark was slightly more effective than hearing it in the light.

Nelson and Moll (38) were also able to show that for the film Theory of Flight, the visual factor was very much more important than the audio in contributing to the total effectiveness of the film. For Problems of Flight, the audio factor was somewhat more important than the visual factor. For these two films the "both" factors were small but positive, indicating that some items were taught by both the audio and visual factors working together. For Land and Live



Group 1 (only) saw the film (no sound).

Group 2 (only) saw the film (no sound).

The second objective film experiment used the following

stimulus divided as follows: (a) first group to follow

Group 1 (control group) did not see or hear the film.

Group 2 (only) heard the film in the light.

Group 3 (only) heard the film in the dark.

Group 4 (only) saw the film (no sound).

Group 5 (only) saw and heard the film.

After the names of the groups were known were announced.

Wilson and Holt (1951) were able to determine that in every

case the groups which had seen the film treatment were judged more

the control groups which did not see or hear any film.

Furthermore, the groups which saw and heard a film were

judged more the groups which only saw or only heard the

film. In each instance, it was found that hearing the sound

track in the dark was slightly more effective than viewing

it in the light.

Wilson and Holt (1951) were also able to show that the

film Impact of Atomic, the visual feature was very much more

important than the music in contributing to the total effect.

Importance of the film. For purposes of Impact, the audio

feature was somewhat more important than the visual feature.

For some of the "low" features were small and poor-

ness, indicating that some items were judged by some the

audio and visual features working together. For Impact and Love

in the Desert, the audio factor was slightly more important than the visual factor in contributing to the total effectiveness of this film. The "both" factor for the film was quite large and negative, indicating that there was some overlap of the audio and visual elements in teaching certain items.

In their experiments, Nelson and Moll (38) were primarily concerned with the over-all effectiveness of the audio and visual elements in contributing to total learning from some typical instructional films. Their experiments did not investigate the relative efficiency of the two media, visual and auditory, mainly because this question posed an experimental problem too difficult for attempted solution at the time. Nonetheless, the research that was successfully conducted did reveal that significant learning accrued from the presentation of the film as a whole, and from the presentation of either the audio or visual channel alone. Yet, neither channel was consistently better than the other. The relative effectiveness seems to depend on the particular film and its content. On the other hand, it was determined that both channels together were consistently better than either one alone. This helped to identify a "both" factor. Where this is a "plus" factor, as in the aerodynamics films study, the "both" indicates that some items are taught jointly by the audio and the visual working together; where "both" is a "minus" factor, as in the desert survival film study,

in the latter, the same result was slightly more important than the visual aspect is considered in the other films. The "form" factor for the film was quite large and positive, indicating that there was some overlap of the audio and visual elements in reaching certain items.

In their experiments, Wilson and Holt (19) were pre-

viously mentioned at the same time all elements of the audio and visual elements is considered in their learning from two typical instructional films. Their experiments did not investigate the relative efficiency of the two media, visual and auditory, which because this question posed in experimental problems was difficult to approach solution of. The film, however, the overhead film was non-selective compared to the visual that elements learning material from the presentation of the film as a whole, and from the presentation of parts of audio or visual material alone. The relative efficiency was considerably better than the other. The relative effectiveness seems to depend on the particular film and its content. On the other hand, it was determined that both media were equally effective in learning. Wilson and Holt, this helped to identify a "form" factor. They also found that, as in the instructional film study, the "form" factor was more important than the "content" factor by the whole and the elements were equally important. In a "form" factor, as in the other studies, it is a



it indicates that some items are taught in both the audio and visual channels. In other words, there is a tendency to some overlapping. In general, with regard to the hearing factor alone, hearing the sound tract in the dark appears to be slightly superior to hearing it in the light.

From these studies, then, it is possible to imply that both the audio and visual elements of films are effective channels of communication. Each channel is uniquely capable of conveying certain types of information. However, since both channels together are more effective than either one alone, the object should be to achieve the best possible integration of the visual and the audio elements of films. (38)

Attitudes and interests. The readily discernable influence of the entertainment motion picture as well as the more recent television gives support to the assumption that audience attitude toward and identification with the main character of a film has some effect on the learning obtained from the film. In this respect, "identification" can be defined as a dynamic process of relating oneself to persons and groups. Stagner (49) stated that, "Identification is the phenomenon which occurs when an individual imputes to himself, and acts out, the characteristics of another person". Identification is accordingly measurable in terms of attitudes held towards these persons and groups. It may be postulated that such attitudes exert a directive influence



on behavior, and that these attitudes influence that learning which is related to these persons and groups. (30)

On the basis of just such a proposition, Kishler (29) has formulated two hypotheses suitable for testing:

1. That individuals for whom the occupational role of the main character of the motion picture had a high prestige value would learn more factual information from the film, and change further, in attitudes in the direction suggested by the film, than those for whom this occupational role had a low prestige value.
2. That where an established identification with a main character could be assumed to exist, on the basis of institutional affiliation, those people who possessed such institutional affiliation would learn more, and change further in attitudes in the direction suggested by the film, than those who had no such affiliation.

In order to test his hypotheses, Kishler (29) devised an experimental procedure incorporating the dramatic film, Keys of the Kingdom, starring the popular actor Gregory Peck, in the well defined role of a Catholic priest. This film depicts the career of a priest who served as a missionary in China, and develops a theme of religious tolerance through the behavior and philosophy of the main character.

To evaluate the audiences' potentiality for identification with the film's main character, two indices were used:

1. A rank-order scale of the prestige of the role of Catholic priest, on which each individual was required to rank, in order of prestige for him, eleven occupations, among which was Catholic priest.



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## 2. Affiliation or non-affiliation with the Catholic Church.

To measure the effects of the film three devices were employed:

1. Two alternate forms of an attitude scale to measure religious tolerance.
2. A test on the factual information in the film.
3. The rank-order scale of occupational prestige.

For his test population, Kishler (29) selected 815 college students which in turn were divided into two subsamples, prestige subsample and affiliation subsample. For the prestige subsample two groups were selected that were comparable with regard to sex distribution and a measure of scholastic aptitude but which differed with respect to the ranking they assigned to the occupation of Catholic priest. Every member of one group ranked the occupation of Catholic priest high, the members of the other group ranked it low. For the affiliation subsample, two groups were likewise selected which were similar on the measure of academic aptitude, but which differed according to membership or non-membership in the Catholic Church.

In the actual testing, the rank-order scale of occupational prestige was administered to the total population followed by one form of the attitude scale on religious tolerance. The film Keys of the Kingdom was subsequently shown.

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This in turn was followed by a presentation to the total population of the same rank-order scale and the alternate form of the attitude scale, as well as the information test based on the film.

With reference to the prestige hypothesis, the results for the information test and the attitude scale were in the direction predicted by Kishler (29), but the differences between those ranking the role of Catholic priest high and those ranking it low were not significant. However, the high rankers themselves exhibited a significant change on the religious tolerance attitude scale in the predicted direction, while those ranking the role low showed only an insignificant change. On the other hand, the results associated with the affiliation hypothesis indicated that the group having institutional affiliation with the Catholic Church remembered more about the action of the film, but by an amount that was at a significant minimum. The religious tolerance scale revealed no significant difference between Catholics and non-Catholics in amount of attitude change. Interestingly enough, both Catholics and non-Catholics rated the role of Catholic priest higher after seeing the film, but the difference between the two groups was apparently not significant.

From the results of Kishler's (29) study, it can be generally concluded that the differences found by him were in the direction predicted by the hypotheses, but very few of



these differences reached accepted levels of statistical significance. These findings, therefore, only lend support to, but do not establish with a high degree of confidence, the proposition that established attitudes towards a film's main character as well as towards the film's theme are matters of importance in the process of learning and the restructuring of attitudes.



These different phases appear to be related  
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## CHAPTER VI

### FINDINGS AND CONCLUSIONS

#### I. SUMMARY

This study has been concerned with an investigation of those problems which are considered to be pertinent and unique in the production of instructional motion pictures when such film production is governed by definite and acceptable principles of psychological learning as adaptable to the characteristics of this teaching medium. It is believed that by making a detailed presentation of the learning principles which appear to be most strongly related to educational material offered in films, and associating such principles directly with specific types of instructional film already incorporating these principles, film producers, who lack a thorough understanding of learning behavior, may be encouraged to attempt new approaches and research leading to more effective instructional motion pictures. As pointed out early in this study, it is the directors, supervisors, and coordinators of visual education in educational systems, institutions, and organizations who must continue to establish liaison between teacher and film producer. It is they who will execute it, and it is they who will administer the program on the local level. Therefore, it becomes highly essential that these groups do understand one

THEORY AND PRACTICE

1. INTRODUCTION

This study has been concerned with an investigation of those problems which are considered to be pertinent and unique in the provision of instructional media systems when such this provision is governed by definite and separate principles of psychological learning as applicable to the characteristics of this learning medium. It is believed that by making a detailed presentation of the learning principles which appear to be most closely related to educational material offered in films, and associating such principles directly with specific types of instructional film thereby investigating these principles, film producers may have a thorough understanding of learning behavior, may be encouraged to attempt new approaches and research leading to more effective instructional media systems. As pointed out early in this study, it is the director, reporter, viewer, and coordinators of visual education in educational systems, institutions, and organizations who must combine to establish liaison between research and film production. It is they who will evaluate it, and it is they who will finally label the system as the ideal level. Therefore, it is somewhat slightly essential that these groups be understood and



another's problems and points of view and, further, that they work together in the solutions of problems to a mutual satisfaction. Film producers must understand the viewpoint of educators. Educators must understand and respect the problems of producers. Visual educationists must, above all, thoroughly understand both. (21)

By relating pertinent and appropriate psychological learning principles to certain classes of actual and research instructional motion pictures, it is possible to present definite, important conclusions and summarized principles concerning the values of films in instruction and their subsequent influence on human learning behavior.

A perusal of this study demonstrates that people do learn from films. Through motion pictures, students are able to obtain factual knowledge, to learn motor skills, to interpret attitudes and opinions, and to react to specific motivations. There is provided further indication that learning from films may be applied to other educational objectives, such as appreciation and orientation. Furthermore, it may be emphasized that instructional films can stimulate other learning activities. This stimulation is manifested in such activities as voluntary reading, discussion, application, teamwork, and the like. Moreover, the fact cannot be ignored that films facilitate thinking and problem solving. The evidence clearly indicates that the contribution of films is to comprehension and understanding, rather than

evidence of progress and points of view and, further, that  
 they were engaged in the solution of problems in a natural  
 situation. Film programs were presented on various  
 subjects. Students were interested and enjoyed the  
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 by relating problems and appropriate psychological  
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 instructional social studies, it is possible to present  
 definite, important concepts and concepts principles  
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 A review of this study demonstrates that people do  
 learn from film. Through social studies, students are  
 able to obtain factual knowledge, as well as social skills, to  
 increase abilities and opinions, and to react to specific  
 situations. There is provided further evidence that  
 learning from film may be applied to other educational co-  
 nitions, such as organization and organization. Furthermore,  
 it may be explained that instructional film can stimulate  
 about learning activities. This stimulation is manifested  
 in such activities as voluntary reading, discussion, appli-  
 cation, research, and the like. However, the fact cannot  
 be ignored that film facilitates thinking and provides self-  
 learning. The evidence clearly indicates that the contribution  
 of film is to comprehend and understanding, rather than

pure rote memory. The investigation of carefully conducted research studies reveals that people taught with films are better able to apply their learning than people who have had no film instruction. Finally, it can be re-emphasized that it is feasible for films to be considered equivalent to a good instructor in communicating facts or demonstrating procedures. However, because there are many teaching situations where this is not advisable, the use of live instruction is not precluded. On the other hand, it does mean that films may be used exclusively for instruction when the instruction involves the presentation of certain facts or demonstrations of particular procedures, and where face-to-face leadership is clearly not required. (23)

From a research of instructional film production and its relation to effective learning behavior, as has been attempted by this study, certain relevant principles governing the dynamics of film influence on behavior can be concluded. Essentially though, it is important to understand that, while a motion picture does not vary objectively from one showing to another, or from one group to another, the meaning of the motion picture always differs, sometimes extremely, among individuals who see the films. This variation in meaning depends on the psychological characteristics of the audience, the social circumstances surrounding the audience, and the content and treatment of the film. Knowledge of the dynamics of film influence makes possible the more accurate



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 research studies reveals that people taught with films and  
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 tion is not provided. On the other hand, it does seem that  
 films may be used advantageously for instruction when the in-  
 struction involves the presentation of certain facts or  
 demonstrations of particular procedures, and where learn-  
 ing is desired. (195)  
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 meaning depends on the psychological characteristics of the  
 audience, the social circumstances surrounding the audience,  
 and the content and treatment of the film. Knowledge of the  
 dynamics of film influence makes possible the more effective

prediction of film results, better planning and production of films, and more effective patterns of film utilization in information, training, and education programs.

## II CONCLUSIONS

A detailed conclusion, therefore, can begin by pointing out that films are of greatest influence when their content reinforces and extends previous knowledge, attitudes, and motivation. They are of least influence when previous knowledge is inadequate, and when the film content is antagonistic or contrary to existing attitudes and motivation. Consequently, a person is able to respond to a film only in terms of what he already knows, what he can do, how he feels, and what he wants. The person is not noticeably changed by the film itself. It can, however, help to change his attitudes and opinions, his knowledge and skills. It should be emphasized, moreover, that the influence of any one film is limited, but the influence of several films is cumulative. This tends to show that the effects of any motion picture depend to a great extent on the reinforcing experiences preceding, following, or coincident with the actual film showing. Therefore, it can be implied that whether intended or used to extend and reinforce present behavior, or to reorganize and redirect behavior, a film is of greatest effect when it is planned, distributed, and used as one of a series of related and cumulative experiences all of which operate





in the same direction. Similarly, when the objective of the film is reorganization and redirection of behavior patterns (including motivation), there is increased necessity for reinforcing the film with additional instruction.

All personnel associated with the planning and producing of instructional films must realize that the influence of a motion picture is specific, not general. This actually holds for all instructional objectives. The cumulative effect of related films, shown over a period of time and reinforced by other instruction, may be general, but even here the general influence is limited to the area of instructional content. This implies that sponsoring agencies should spell out the instructional or informational objectives of the film in very specific terms. Failure to define film objectives specifically at the planning stage of production handicaps film production severely and reduces the probability that the film will be as effective as possible.

In a like manner, the influence of a motion picture increases as the content of the film is directly relevant to the audience reaction it is intended to influence. Subject matter content and film treatment are instrumental, always and only, to some end product of audience response. This in turn emphasizes that film sponsors must be explicit as to the instructional objectives in terms of the specific behavior the film is intended to influence. This means that sponsors must clearly indicate what or how the trainees are

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expected to know, think, feel, and do as a result of seeing the film.

From the principle of audience variability it can be deduced that reactions to a motion picture vary with film literacy, abstract intelligence, formal education, age, sex, previous experience in the subject, and prejudice or predisposition of the audience. The fact that differences in heredity and social experience mean differences in reaction to a film, such differences increasing with maturity, presents implications for the film producer. While the influence of a film will generally be in the direction of the bias of the film, the amount of this influence will vary among individuals. There are likely to be instances of "reverse" or "boomerang" effects unless the film is appropriately planned, produced, and used. Thus, effective film planning, production, and employment depend on reliable information, attitudes, stage of training, intelligence, formal education, and social outlook of the audience.

It is particularly important that film producers take critical care in applying picture primacy to their instructional films. The fact that the influence of the motion picture is primarily in the picture, secondarily in the accompanying language and/or music, and is relatively unaffected by "slick" production techniques cannot be obscured. Trainees learned more from the pictures than the commentary. Learning involves discovery. Pictures make discovery possi-



regarded as knowledge, truth, and so on as a result of seeing  
the film.

From the principle of audience variability it can be  
deduced that reactions to a motion picture vary with film  
literacy, abstract intelligence, formal education, age, sex,  
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fluence of a film will generally be in the direction of the  
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planning, production, and equipment depend on reliable  
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It is particularly important that film producers take  
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ble. Language articulates discovery or alerts the audience to it. Appropriate music underscores mood. Therefore, no producer should plan a film that does not lend itself to fluent picture conception and specification. This means that picture-thinking must dominate verbal-thinking in the over-all production process and language (commentary, narration, and dialog) should be held to a minimum in a motion picture.

In a like manner, producers must keep in mind the importance of pictorial context. Response to motion pictures is selective in terms of the familiarity and significance to the audience of the pictorial context in which the action takes place. Not everything shown or said in a motion picture is seen or heard by the audience. Response to films can be said to be selective, not photographic. Scenes and sequences are seen and heard when the pictorial background is familiar and the action or object is significant to the audience. Essentially, then, the meaning lies not in the action itself, but in the importance of the action; not in the close-ups, but in the significance of the objects in the close-ups; not in the manner of performing the task, but in the reality of the task to the audience. Thus, no matter what form or treatment is used in a film, important scenes and interpretations must be made to appear important to the audience.

Of like importance is the subjectivity of the film.

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Response to a motion picture is most intense, efficient, and predictable when the pictorial content is subjective to the audience. This applies both to the camera position from which the content is photographed, and to the way the content is presented. The subjective camera-angle is considered superior to the objective or 180 degree angle frequently used in instructional film production dealing with the teaching of motor tasks. Moreover, direct instructions and direct address to the audience are better than the third-person, passive voice, and showing errors the trainees are likely to make in performing a task improves an instructional film. This implies to the film producer that he should treat the content of a film the way the audience views the subject, and the treatment should be developed so the audience can see itself in the picture, and admire the principle characters. This latter implication is important because the prestige value attached by the audience to the role of the principle character (protagonist) increases the influence of a film on attitudes and factual learning.

As demonstrated in chapter V of this study, the rate of development of the subject content of a particular film is an essential factor influencing the learning to be derived from the film. The impact of a motion picture on its audience can often be traced to the influence of the development rate. As has been shown, where learning rather than entertainment is involved, a slow rather than a rapid rate of

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development is necessary. Rapid rate of development in the presentation of a subject in instructional films reduces the amount of learning from the film. Consequently, film-makers must keep in mind that the rate of learning of the audience is generally slower than the subject matter expert may think. It is important, then, that there be no attempt to cover too much ground too quickly in any one film, but rather that an effort be made to gear the rate of development of a film to the rate of learning of the audience.

Inasmuch as instructional techniques built into a film or applied by the instructor to fit a particular film substantially increase the instructional effectiveness of a film, it behooves film producers to design appropriate instructional techniques and methods directly into instructional films, particularly when conditions of use are likely to be less than the best. Such techniques would involve relevant orientation to and/or relevant summary of the subject content of the film, audience participation (or practice) during or following a film showing, repeated film showings and/or repetition within a film, and an adequate knowledge of results of learning.

A final principle governing the influence of films on learning behavior involves instructor leadership. There can be no denying the fact that the efficiency of learning performance of a group to whom a film or filmstrip is exhibited is influenced by the leadership of the instructor who uses



development is necessary. Beyond some development in the presentation of a subject in instructional film remains the amount of learning from the film. Consequently, the above must keep in mind that the rate of learning of the audience is generally slower than the subject matter which they learn. It is important, then, that there be an attempt to cover the subject matter as quickly as possible in the film, but to keep the effect of the film on the rate of development of a film in the rate of learning of the audience.

Instruction as instructional technology will have a film or applied by the instructor to the particular film and the amount of learning from the instructional effectiveness of a film. It involves the instructor in design and application in instructional technology and the amount of learning from the instructional film, particularly the conditions of use are likely to be less than the best. When technology would involve relevant experience in and/or relevant activity of the subject content of the film, audience participation for learning is taking as following a film showing, reviewing film showing and/or repetition with a film, and an adequate knowledge of learning or learning.

A film technique involving the instruction of film on learning involves learning instruction learning. There can be no denying the fact that the efficiency of learning from a film is a great deal more than the efficiency of learning from a film. It is indicated by the instructor who uses

the film or filmstrip, as well as by the effectiveness of the film or filmstrip itself. There are strong implications to support the evidence that films cannot substitute completely for the good instructor, except perhaps in specific, isolated situations. Therefore, effective training of instructors still remains one of the most essential assets in providing the greatest effectiveness in film instruction. This tenet is borne out by the fact that one of the most significant findings of current film research is the fact that the amount that trainees learn from a film depends not only on the film itself, and the audience itself, but also on the motivation and morale that result from the leadership qualities of the instructor. Motivation and morale carry over to film learning, even when the instructor is not actually present, during the film showing. Unmistakably, high morale means high learning, low morale means low learning from a film (23)

From a review of motion picture film research and the investigation conducted by this study, there clearly emerge several basic and all encompassing conclusions applicable to motion pictures in training, orientation and information: (1)

1. The educational effectiveness of films can be improved, but to do so, steps must be taken all along the line from the origin of the film idea to the employment of the film in instruction, and not simply at the production stage.

2. The effectiveness of films in instruction depends on

the film on filmstrip, as well as by the effectiveness of the film on filmstrip itself. There are strong indications that to support the evidence that film cannot substitute completely for the good instructor, except perhaps in specific, isolated situations. Therefore, effective training of instructors will require one of the most essential steps in providing the greatest effectiveness in film instruction. This seems to come not by the fact that one of the most important findings of current film research is the fact that the amount that students learn from a film depends not only on the film itself, but on the audience itself, but also on the motivation and attitude of the audience. From the leadership qualities of the instructor. Motivation and attitude carry over to film learning, even when the instructor is not actually present during the film showing. Qualitatively, high quality means high learning, low quality means low learning from a film (2).

From a review of various studies film research and the investigation conducted by this study, some clearly emerge as general basic and all encompassing conclusions applicable to most situations in training, education and instruction: (1) The essential effectiveness of films can be improved, but to do so, steps must be taken all along the line from the origin of the film idea to the emphasis of the film in instruction, and not simply at the production stage. (2) The effectiveness of film in instruction depends on



the relationship of the film content to the audience and the relevance of their use, and not solely on the film itself.

3. Within the film, treatment of the content in terms of psychological and instructional principles governing audience reaction is of greatest importance. Film techniques involving special effects and elaborate musical scores appear to be of minor importance.

Finally, then, it can be emphasized that the major contention of this study was that certain principles operate to facilitate or to impede learning. The arrangement and administration of learning situations is governed by instruction itself. When learning situations are arranged and administered so that basic principles of learning are used to facilitate learning, the effectiveness of instruction may be expected to improve. Unfortunately, in actual practice, instruction often is conducted with a neglect of facilitating principles of learning. Not infrequently, these principles may operate in instructional situations in such a way even as to retard learning. Obviously, the ineffectiveness of this type of instruction is not deliberate, rather it stems from a lack of understanding of the principles involved.

Instructional motion pictures, which means motion pictures involving the prearrangement of learning situations

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Instructional media choices, which means media cho-  
ices involving the presentation of learning situations

so as to facilitate learning, will be most effective when they are produced with a thoughtful use of those principles that encourage learning. The least that can be conscientiously agreed to is that instructional films should not violate facilitating principles of learning. (22)

It can be assumed from this study that motion pictures and television are potentially powerful mass communication devices. Further research seems indicated in order to more clearly determine the effect of this power and influence in all fields of education



as an effective measure. It will be most effective when

it is combined with a long-term use of these funds.

It is also necessary to have the same kind of an

effectively used in the long term. It should

not violate the principle of justice. (193)

It can be argued from this that action should

and relation are possibly powerful new communication

devices. Further research seems indicated in order to

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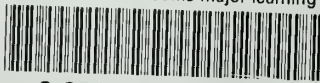






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